SERVICE MANUAL

NORDIC SERIES

ASH-18AIN (PT), ASH-24AIN (PT)

sinclair
AIR CONDITIONING

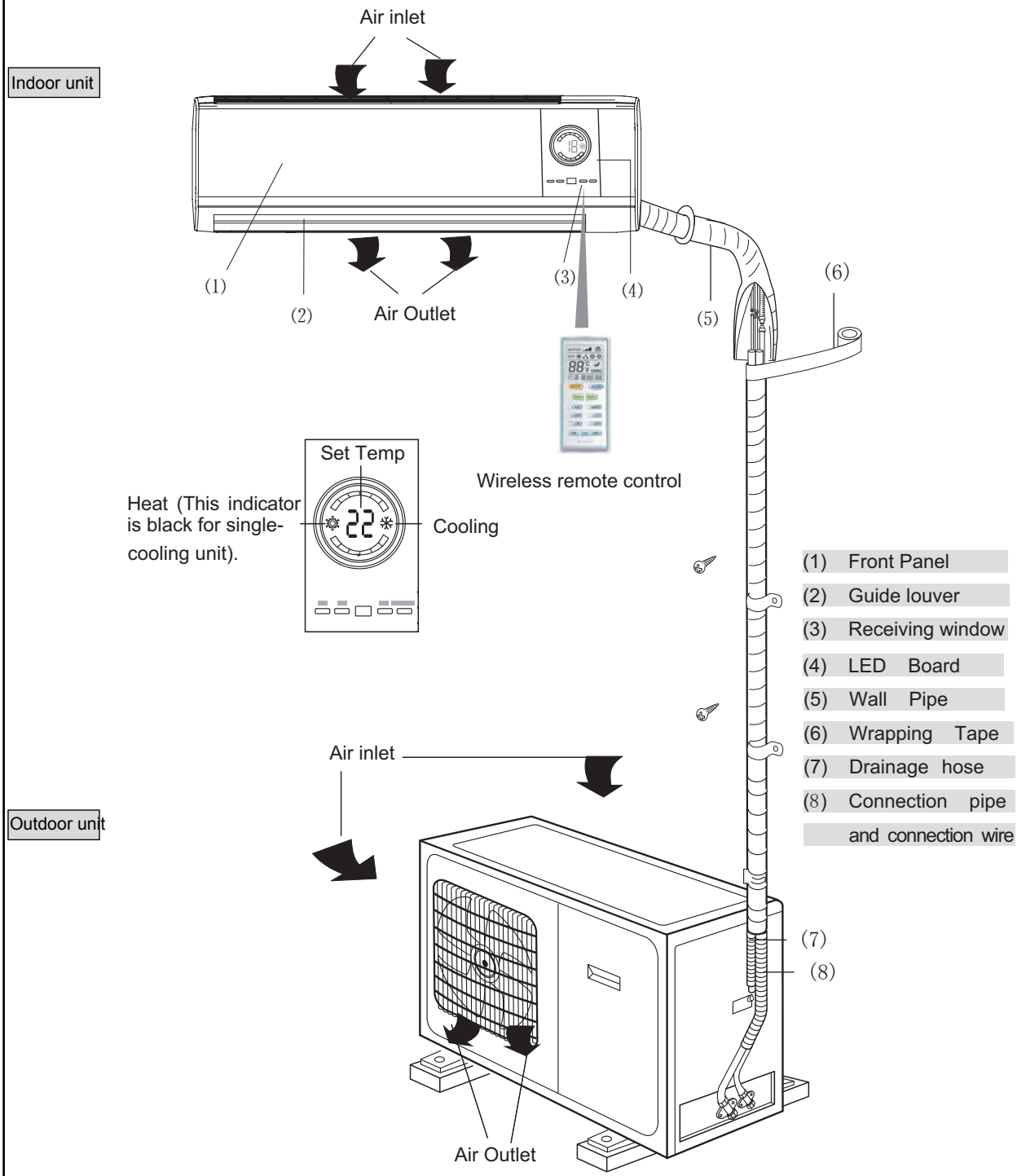
2 Specifications and Technical Parameters

Model		ASH-18AIN (PT)		ASH-24AIN (PT)	
Function		COOLING	HEATING	COOLING	HEATING
Rated Voltage		220-240V~		220-240V~	
Rated Frequency		30 / 100 / 75	30 / 100 / 72	25 / 100 / 82	25 / 100 / 74
Total Capacity (W) (Low / High / Standard)		2500 / 5800 / 5300	2300 / 6400 / 5850	2000 / 6800 / 6500	1600 / 8200 / 6500
Total Capacity (Btu/h) (Low / High / Standard)		8500 / 19800 / 18100	2300 / 6400 / 5850	6800 / 23200 / 22200	5460 / 28000 / 22200
Power Input (W)		620 / 2200 / 1560	550 / 2250 / 1620	520 / 2450 / 2020	470 / 3250 / 1800
Rated Input (W)		2400	2450	3200	3250
Rated Current (A)		10.48	10.71	14	14.2
Air Flow Volume (m^3/h) (H/M/L)**		900 / 800 / 675		850 / 750 / 650	
Dehumidifying Volume (l/h)		2		2.4	
EER / C.O.P (W/W)		3.40 / 3.61		3.22 / 3.61	
Energy Class		A / A		A / A	
Indoor unit	Model of Indoor Unit	ASH-18AIN (PT)		ASH-24AIN(PT)	
	Fan Motor Speed (r/min) (H/M/L)	1400/1200/1100		1400/1200/1100	
	Output of Fan Motor (w)	45		45	
	Input of Heater (w)	/		/	
	Fan Motor Capacitor (uF)	3		3	
	Fan Motor RLA(A)	0.2		0.2	
	Fan Type-Piece	Cross flow fan – 1		Cross flow fan – 1	
	Diameter-Length (mm)	ϕ 96 X 797		ϕ 96 X 797	
	Evaporator	Aluminum fin-copper tube		Aluminum fin-copper tube	
	Pipe Diameter (mm)	Φ 7		Φ 7	
	Row-Fin Gap(mm)	2-1.6		2-1.6	
	Coil length (l) x height (H) x coil width (L)	787X400X25.4		787X400X25.4	
	Swing Motor Model	MP28AA		MP28AA	
	Output of Swing Motor (W)	2		2	
	Fuse (A)	PCB 3.15A Transformer 0.2A		PCB 3.15A Transformer 0.2A	
	Sound Pressure Level dB (A) (H/M/L)	48/43/40		48/43/40	
	Sound Power Level dB (A) (H/M/L)***	58/53/50		58/53/50	
	Dimension (W/H/D) (mm)	1020X319X234		1020X319X234	
	Dimension of Package (L/W/H) (mm)	1078X325X390		1078X325X390	
	Net Weight /Gross Weight (kg)	13/17		13/17	

Outdoor unit	Model of Outdoor Unit		ASH-18AIN (PT)	ASH-24AIN (PT)
	Compressor Manufacturer/trademark		SANYO	SANYO
	Compressor Model		C-6RVN93H0V	C-6RZ146H1B
	Compressor Type		Double Rotary	Double Rotary
	L.R.A. (A)		41	32
	Compressor RLA(A)		7	7.78
	Compressor Power Input(W)		1610	1500
	Overload Protector		1NT11L-3979	1NT11L-3979
	Throttling Method		Capillary	Capillary throttling
	Starting Method		Transducer starting	Transducer starting
	Working Temp Range (℃)		-15℃≤T≤46℃	-15℃≤T≤46℃
	Condenser		Aluminum fin-copper tube	Aluminum fin-copper tube
	Pipe Diameter (mm)		7	Φ9.52
	Rows-Fin Gap(mm)		2-1.4	2-1.4
	Coil length (l) x height (H) x coil width (L)		838×660×25.4	731X813X44
	Fan Motor Speed (rpm)		780/600	780/620
	Output of Fan Motor (W)		60W	60
	Fan Motor RLA(A)		0.26	0.3
	Fan Motor Capacitor (uF)		3	2
	Air Flow Volume of Outdoor Unit		2700	/
	Fan Type-Piece		Axial fan –1	Axial fan –1
	Fan Diameter (mm)		460	460
	Defrosting Method		Auto defrost	Auto defrost
	Climate Type		T1	T1
	Isolation		I	I
	Moisture Protection		IP24	IP24
	Permissible Excessive Operating Pressure for the Discharge Side(MPa)		3.8	3.8
	Permissible Excessive Operating Pressure for the Suction Side(MPa)		1.2	1.2
	Sound Pressure Level dB (A) (H/M/L)		56	58/55
	Sound Power Level dB (A) (H/M/L)		66	68/65
	Dimension (W/H/D) (mm)		848X685X378	950X840X420
	Dimension of Package (L/W/H)(mm)		994X428X750	1100X450X905
	Net Weight /Gross Weight (kg)		52 / 57	68/73
	Refrigerant Charge (kg)		R410A / 1.6	R410a/2.4
Connection Pipe	Length (m)		5	5
	Gas additional charge(g/m)		22	50
	Outer Diameter	Liquid Pipe (mm)	Φ6(1/4")	Φ9.52(3/8")
		Gas Pipe (mm)	Φ12(1/2")	Φ16(5/8")
	Max Distance	Height (m)	8	8
		Length (m)	30	30

The above data is subject to change without prior notice.

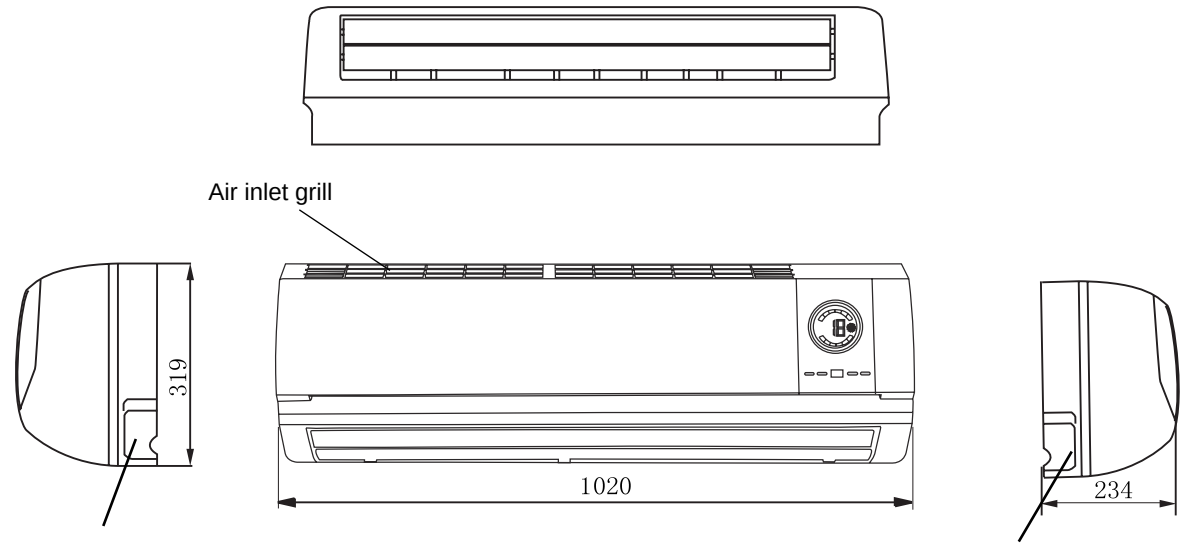
3 Component Name

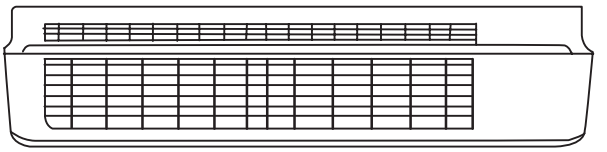


(1) Front Panel
(2) Guide louver
(3) Receiving window
(4) LED Board
(5) Wall Pipe
(6) Wrapping Tape
(7) Drainage hose
(8) Connection pipe and connection wire

4 Overall and Installing Dimension

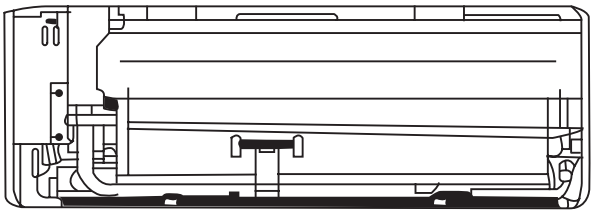
4. 1 Overall and Installing Dimension of Indoor Unit

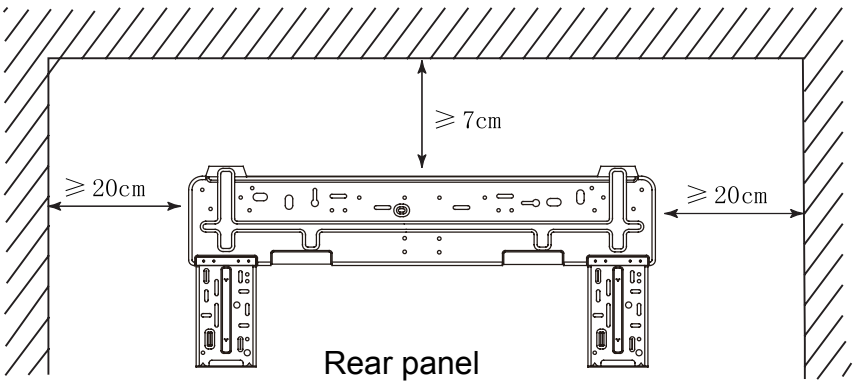




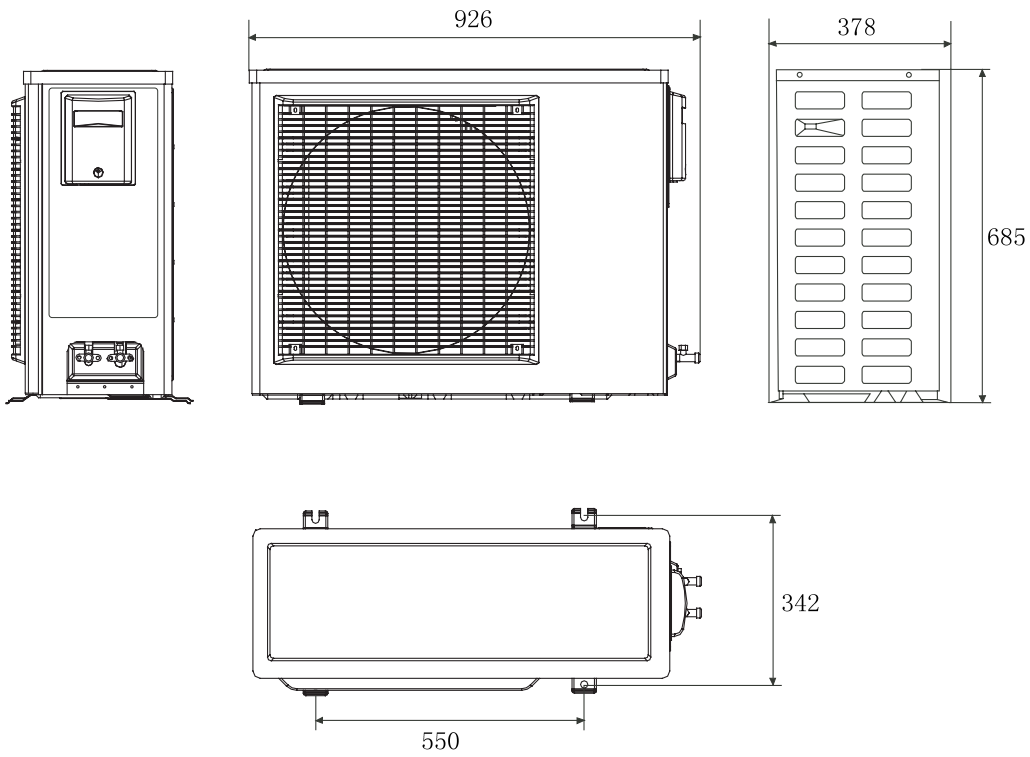
Rear View

Unit: mm

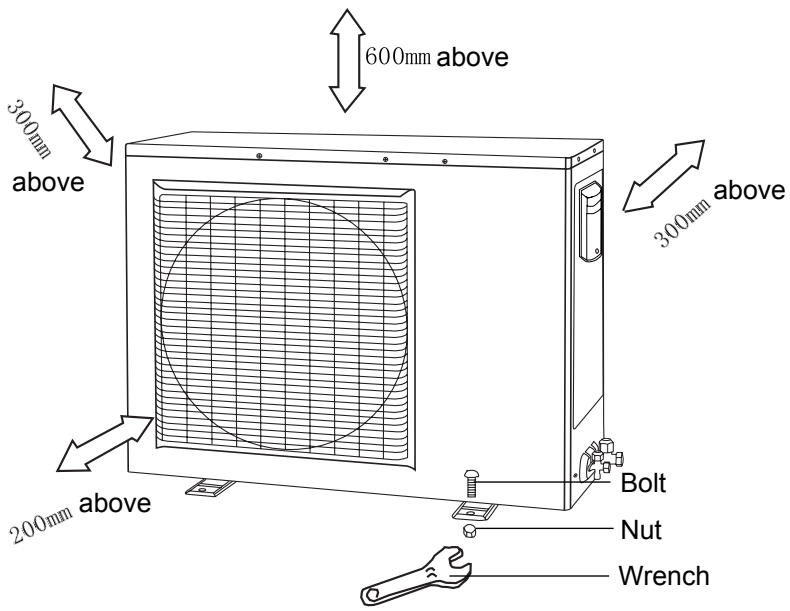




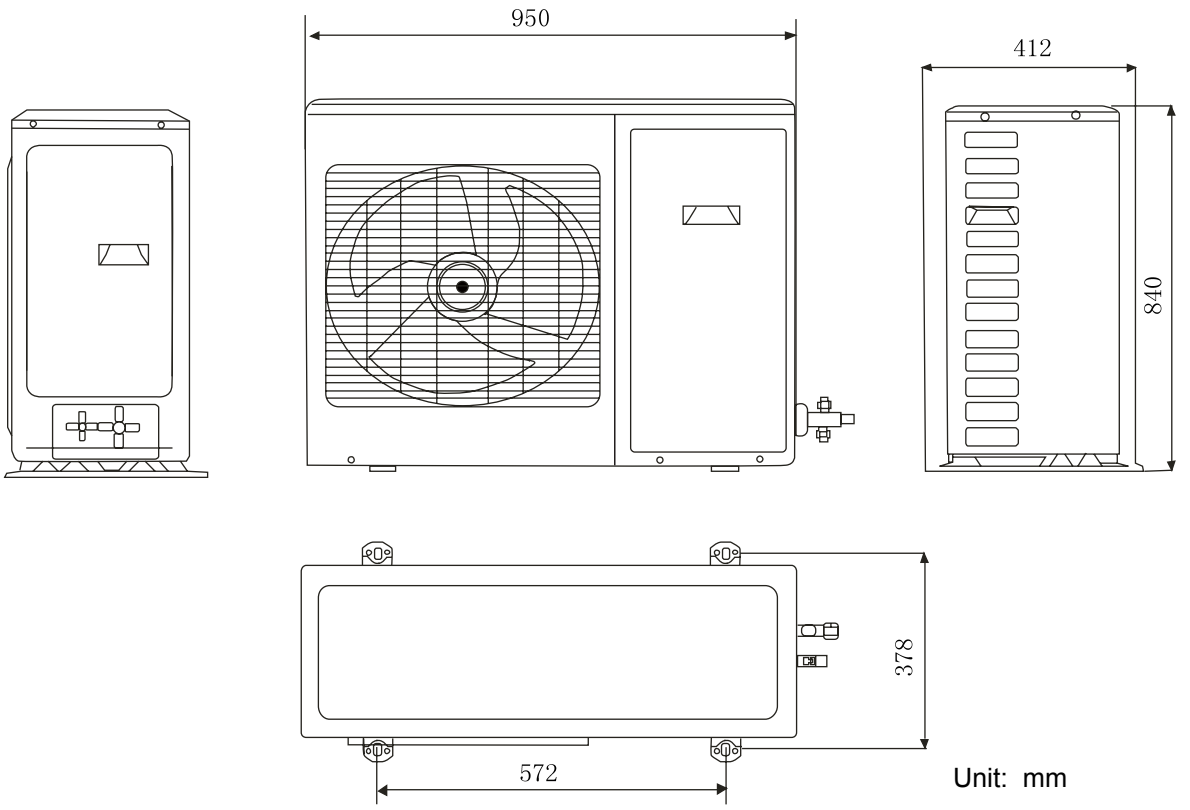
4. 2 Overall and Installing Dimension of Indoor Unit(18K)



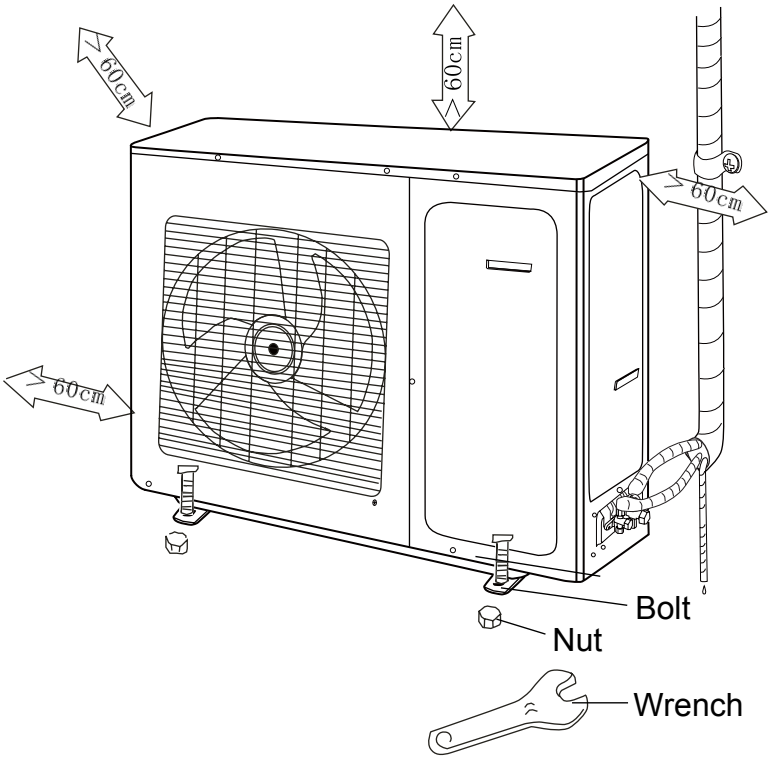
Unit: mm



4. 3 Overall and Installing Dimension of Indoor Unit(24K)

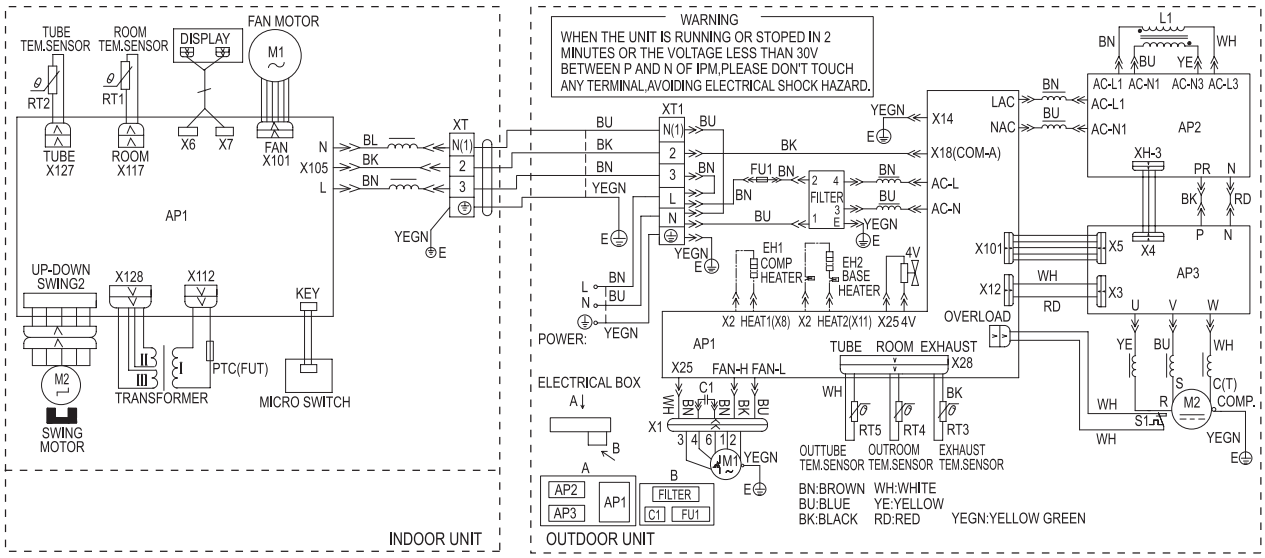


Unit: mm

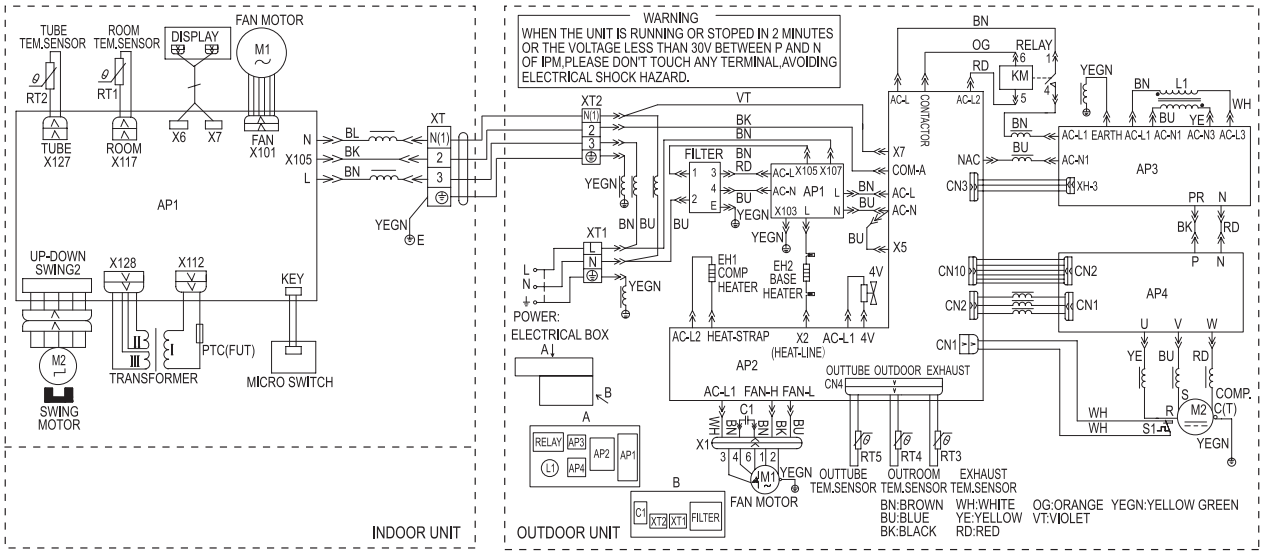


5 Electrical Diagram

ASH-18AIN (PT)



ASH-24AIN (PT)



6 Manual of functions of remote controller and operation method

6.1 Manual of functions of remote controller

Applicable to ASH-18AIN (PT)Controller Function of Indoor Unit

1Temperature parameters

◆ Indoor setting temperature (Tpreset)

◆ Indoor ambient temperature (Tamb.)

2 System basic function

2.1 Cooling mode

In this mode, the indoor fan will run at preset fan speed.
When the compressor stops for outdoor unit malfunction protection, the indoor fan will still run at preset fan speed.

➢ Temp. can be set in the range of 16-30℃.

2.2 Dehumidifying mode

Indoor fan will run at low speed invariably. Swing will operate according to setting status.

➢ Temp. can be set in the range of 16-30℃.

2.3 Fan mode

Indoor fan and swing will operate according to setting status.

➢ Temp. can be set in the range of 16-30℃.

2.4 Heat mode

In heating mode, if compressor is running, indoor fan will delay to run to avoid cold air blowing.When compressor stops, blowing
When compressor stops, blowing residual heating will enter.
Blowing residual heat: In heating mode, the unit is stopped by remote controller, indoor fan will continue to run for 60s. Fan speed can not be switched during blowing residual heat.

➢ Temp. can be set in the range of 16-30℃.

2.5 Auto mode

In this mode, the system selects COOL, HEAT and FAN mode automatically according to the change of ambient temperature.
Protection function is the same as that in cooling and heating mode.

3 Other control

3.1 ON/OFF

Each time the On/Off ⏻ button of the remote controller is pressed, the On/Off state will switch once.

3.2 Modes selection

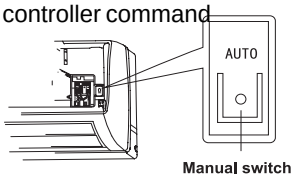
Press the MODE button on the remote controller to select and display the following modes:
AUTO, COOL, DRY, FAN, HEAT,AUTO.

3.3 **TEMP. Setting Button**

Each time ∧ ∨ button is pressed, the set temperature will be increased or decreased by 1℃.Adjusting range is 16~30℃. In AUTO mode, this button does not function.

3.4 Manual Button (ON/OFF)

If press AUTO button under off status of the unit, the unit will run under auto mode with swing.If press AUTO button under on status of the unit,the unit will be stopped.If remote controller command is given,the mian unit will run under the command.



Manual switch

3.5 Timer function

3.5.1 Timer on

The system will continue to run if TIMER ON is set when the system is under ON status. If TIMER OFF is set when the system is under OFF status, the system will start to run under preset mode upon the time for auto start.

3.5.2 Timer off

If TIMER OFF is set when the system is under OFF status, the system will maintain its standby status upon the time for auto stop. If the TIMER OFF is set when the system is under ON status, the system will be stopped upon the tome for auto stop.

3.5.3 Set TIMER ON/OFF Simultaneously

If TIMER ON and TIMER OFF is set simultaneously when the system is under run status, the system will maintain its current operating status and be stopped upon the coming of preset time

If TIMER ON and TIMER OFF is set simultaneously when the system is under stop status, the system will maintain its stop status. It will be started until the time for auto start.

At the time for auto start every day, the system will run under preset mode.At the time for auto stop, the system will be stopped.

Noise silencing is provided under heating mode. If the unit is restarted in less than 3 minutes after it is stopped,3-minute lag protection is provided for the compressor.

3.5. 4 Change of Timer

When the system is under TIMER ON/OFF status, switch on or off the unit by pressing ON/OFF key by remote controller, Timer can be reset. The system will run under the last status setting.

3.6 Sleep Function

Setting SLEEP function under COOL or DEHUMIDIFY mode, the preset temperature will automatically rise by 1℃ after 1 hour and rise by another 1℃ after 2 hours. Preset temperature will rise by 2℃ in total within 2 hours. After that, the unit will run at this preset temperature , the indoor fan will run at preset speed.

Setting SLEEP function under HEAT mode, the preset temperature will automatically decrease by 1℃after 1hour and decrease by another 1℃after 2 hours. Preset temperature will decrease by 2 ℃ in total within 2 hours. After that, the unit will run at this preset temperature , the indoor fan will run at preset speed.

No sleep function under fan mode and auto mode.

3.7 Speed Control of Indoor Fan

The indoor fan will select fan speed(HIGH, MED or LOW) automatically according to the change of ambient temp.It can also be set by remote controller.

3.8 Buzzer

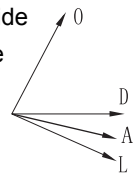
When the unitis energized, pressed, or receives a signal from remote controller, the buzzer will give out a beep.

3.9 Swing Control

After energized, guide louver will first anticlockwise turn to A position, and then close the air outlet.

After the unit is turned on, guide louver will return standby to max. air outlet D2 for heating; for cooling, guide louver will first turn to air outlet D1 and then return standby to L1. If the unit is in swing condition, the guide louver will swing between L1 and D1 for cooling and between L and D2 for heating.

After the unit is off, guide louver will anticlockwise turn to A position to close air outlet.



3.10 Memory Function

What can be memorized includes: mode, swing,preset temperature, preset fan speed.If the system is in timer and sleeping status,preset timer and sleeping can not be memorized and will be canceled after the power is off,which must be reset,

3.11 Indoor Indicators

In normal state,power supply/mode/fan speed/preset temp. indicator will display by current state.Every time of receiving command from remote controller,preset temp. will display blink for 10s.In other conditions,ambient temp. displays.

Controller Function of Outdoor Unit

1 Temperature Parameters

1.1 Cooling Mode

1.1.1 Working Conditions and Process of Cooling

If the compressor is in off status,and ($T_{in\text{-}amb.}$-T_{preset}) ≥0.5℃ , start the unit in cooling mode,in which case,outdoor fan and compressor start running,and microcomputer will auto adjust the frequency of compressor by cooling capacity requirements.

In cooling running,if 0 ℃ ≤ (T_{preset}-$T_{in\text{-}amb.}$) ≤ 2 ℃ ,the compressor will run at low frequency.

In cooling running,if capacity requirements is 0(unit stop for cooling),and (T_{preset}-$T_{in\text{-}amb.}$) > 2℃,the compressor will stop, and outdoor fan will stop running in 60S.

- In this mode, switch valve is de-energized,and the temp. can be set in the range of 16-30℃ .

1.1.2 Antifreeze Protection

In cooling or dehumidify mode,if it is detected that the system is under antifreeze protection, the compressor will stop or run with frequency decline ,and outdoor fan will bestopped in 60S. When antifreeze protection is releasedthe unit will resume its original operating status.

1.2 Dehumidifying Mode

1.2.1 Working Conditions and Process of Dehumidifying

Same with Cooling Mode

- In this mode, switch valve is de-energized,and the temp. can be set in the range of 16-30℃

1.2.2 Protection is same with Cooling mode

1.3 Fan Mode

Compressor, outdoor fan and 4-way valve shut off.

- Temp. setting range:16-30 ℃ .

1.4 Heating Mode

1.4.1 Working Conditions and Process of Heating

If Tamb－3℃≤Tpreset－0.5℃, the unit will start heating, in which case, compressor, outdoor fan and 4-way will run.

If Tamb－3℃≤Tpreset＋2℃, the compressor will run at 30Hz.

If Tamb－3℃＞Tpreset＋2℃, the compressor will stop running and outdoor fan will stop running after 1min delay.

Stop the unit or switch into other modes in heating mode, the 4-way valve will de-energize after the compressor has stopped for 2min.

- In this mode, the Temp. setting range should be 16-30℃.

1.4.2 Defrosting Process

Outdoor microcomputer system will accord to the frost on evaporator, outdoor tube temp sensor to judge whether it enters defrosting process. If satisfied the defrosting process, compressor will stop, 4-way valve reversal; Compressor runs at high frequency running, indoor fan will run by blowing exhaust heat.

2.Current Protection Function in Cooling/Heating/Dehumidifying Mode

2.1 Overload pretection

When Ttube is detected too high, the compressor will run in limited or dropped frequency.When Ttube goes on rising over the stated value, the compressor will stop.If Ttube resumes normal,so does the complete unit according to capacity requirements.

If 6 successive times ofoverload protection happens,the compressor won't resume running except pressing ON/OFFbutton.

In running process,if the comprssor has runfor 7 min,the times of overload protection will be cleared.

2.2 Delay pretection for compressor

Once be stopped, the compressor can not be restarted within 3mins.

2.3 Exhaust Temperature Protection

If it is detected by the outdoor controller that the exhaust temperature is too high, the compressor will run in limited or dropped frequency.

If the exhaust temperature goes on rising over the stated value, the compressor will stop and it is detected that the exhaust temperature has resumed normal, the compressor will resume running according to capacity requirements.

If 6 successive times ofoverload protection happens,the compressor won't resume running except pressing ON/OFFbutton.

In running process,if the comprssor has runfor 7 min,the times of overload protection will be cleared.

2.4 Current Protection Function

2.4.1.Overload protection

Once detected the whole unit current exeed the limit value 14. OA, that indoor temp. arrived, the unit will stop to run, the compressor stopped 3mins, will automatically resume to running status, protection times exceeds 6 times (If compressor running time exceeds 7mins that the protection times will be cleared to 0), the system will be turned off and send the over current protection malfunction signal to indoor unit, cannot automatically resume to run, it must be press ON/OFF to turn off the unit.

2. 4. 2 Current drop frequency, limit frequency control

When detected the whole unit current ≥12. 0A, forbidden frequency rise.

When detected the whole unit current ≥13. 0A, and f > max. running frequency, compressor drop frequency.

2.5Communication malfunction

When continuously 3mins. without receive from indoor or 10s cannot receive signal from drive board that is communication malfunction, outdoor unit will stop.

2.6 Module protection

Module protection, compressor stop, the unit will stop when indoor temp. arrive at setting temp., after compressor has stopped 3mins. later, it will resume to running status; if continuously 6 times module protection, the compressor cannot resume to run. It is need to press ON/OFF can resume. (If compressor running time exceeds 7min that the protection time will be clear to 0).

2.7 Demagnetization current protection

The peak value for demagnetization current is 41A, when deteced this value is more than regulated value, whole unit will drop frequency, after drop frequency, if detected the value still more than regulated value, the compressor will stop to run. After drop frequency, if the value is less than the regulated value, it will resume to the target frequency point. And resume to the target frequency point procedure, detect demagnetization current peak value is more than regulated value, then execute the drop frequency order.

2.8 Compressor phase current protection

During compressor running, detected the compressor's phase current and according to the following logic for control:

(1) If detected DC generatrix current ≥13A, compressor drop frequency running (indicator displays DC generatrix overcurrent protection drop frequency), then detected DC generatrix current <12A, and target frequency more than the running frequency, the compressor's frequency rise up to target frequency running, if target frequency is less than frequency or there is any other frequency happens, the slow rise limit will be canceled. When whole unit running drop frequency arrives the lowest frequency and DC generatrix ≥13A, when arrive at the temperature point unti will stop and displays the generatrix over current protection malfunction, compressor has stopped 3mins, will automatically resume to running status.

(2) If compressor frequency rise and deteced any phase current ≥12A that the compressor frequency rise up to the target frequency running.

2.9 Module over heat protection function

If detected the module surface temp. ≥110 ℃, the whole unit will accord to IPM module protection process.

3 Outdoor indicators display status

The meaning of lights blinks for mainbaord

D101 (Green)	Definition	D102 (Red)	Definition	D104 (Yelllow)	Definition
1Blink	Compressor runs	1Blink		1Blink	Air exhaust protection drop frequency
2Blinks	Unit stop for compressor high pressure protection	2Blinks		2Blinks	Over current protection drop frequency
3Blinks	Unit stop for air exhaust protection	3Blinks		3Blinks	Refrigerant over load drop frequency
4Blinks	Unit stop for communication malfucntion (including indoor unit and drive board)	4Blinks		4Blinks	Heating anti-high temp. drop frequency
5Blinks	Unit stop for module protection	5Blinks		5Blinks	Preserved for one to two use
6Blinks	Unit stop for over current protection	6Blinks	Communication malfunction signal sent from indoor	6Blinks	Defrosting
7Blinks	Unit stop for refrigerant overload	7Blinks		7Blinks	Anti-freezing protection drop frequency
8Blinks	Unit stop for heating anti-high temp.	8Blinks		8Blinks	DC generatrix over current protection drop frequency
9Blinks	Unit stop for refrigerant anti-freezing				
10Blinks	Unit stop for Temp. sensor malfunction				
11Blinks	Unit stop for compressor overload protection				
12Blinks	Unit stop for compressor low pressure protection				
13Blinks	Unit stop for DC generatrix over current protection				
14Blinks	EEPROM fault				
15Blinks	DC power supply short circuit				

D105 (Red)	Definition	D106 (Green)	Definition	D108 (Green)	Definition
1Blink	Air exhaust protection limit frequency	1Blink	Air exhaust protection limit frequency	1Blink	Received verified correct indoor data
2Blinks	Overcurrent protection limit frequency	2Blinks	Outdoor tube sensor malfunction		
3Blinks	Refrigerant overload limit frequency	3Blinks	Outdoor air exhaust sensor malfunction		
4Blinks	Heating anti-high temperature limit frequency	4Blinks	Preserved		
5Blinks	Preserved for one to two use	5Blinks	Malfunction with drive board (cannot receive correct data from drive board 10s)		
6Blinks	Oil return	6Blinks			
7Blinks	Anti-freezing drop frequency	7Blinks			

Meaning of lights blinks for drive board

LED1 Red-Drive	Definition	LED2 Green-Drive	Definition
Dark	Normal, reset unit stop	Bright	Communication malfunction (no data receiving by10s)
1Blink	Compressor normally runs	Blink	Communication normal
2Blinks	Unit stop for abnormal		
3Blinks	IPM protection IPM		
4Blinks	Demagnetization protection		
5Blinks	PFC protection PFC		
6Blinks	Continuously 5times startup failure		
7Blinks	Startup failure		
8Blinks	Lack voltage		
9Blinks	Over voltage		
10Blinks	IPM overheat protection		

6 Controller Function Manual

6.2 Remote Controller Function Manual

Applicable to: ASH-24AIN (PT) Controller Function of Indoor Unit

1 Temperature Parameters

- Indoor preset temperature (T_{preset})
- Indoor ambient temperature ($T_{amb.}$)

2. Basic Functions

2.1 Cooling Mode

In this mode, the indoor fan will run at preset fan speed. When the compressor stops for outdoor unit malfunction protection, the indoor fan will still run at preset fan speed.

- **Under this mode, temperature setting range will be 16-30℃.**

2.2 Dehumidifying Mode

Indoor fan will run at low speed invariably. Swing will operate according to setting status.

- **Under this mode, temperature setting range will be 16-30℃.**

2.3 Fan mode

Under this mode, indoor fan motor, swing motor will run at setting status.

- **Under this mode, temperature setting range will be 16-30℃.**

2.4 Heating Mode

In heating mode, if compressor is running, indoor fan will delay to run to avoid cold air blowing. When compressor stops blowing residual heating will enter. Blowing residual heat: In heating mode, the unit is stopped by remote controller, indoor fan will continue to run for 60s. Fan speed can not be switched during blowing residual heat.

- **Under this mode, temperature setting range will be 16-30℃.**

2.5 Auto Mode

In this mode, the system selects COOL, HEAT and FAN mode automatically according to the change of ambient temperature. Protection function is the same as that in cooling and heating mode.

3 Other Control

3 .1 ON/OFF

Each time the On/Off ⏻ button of the remote controller is pressed, the On/Off state will switch once.

3.2 MODE Selection

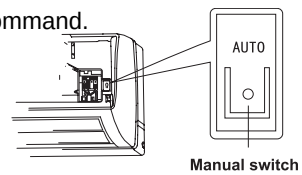
Press the MODE button on the remote controller to select and display the following modes:
AUTO, COOL, DRY, FAN, HEAT,AUTO.

3.3 TEMP. Setting Button

Each time ∧ ∨ button is pressed, the set temperature will be increased or decreased by 1℃.Adjusting range is 16~30℃. In AUTO mode, this button does not function.

3.4 Manual Button (ON/OFF)

If press AUTO button under off status of the unit, the unit will run under auto mode with swing.If press AUTO button under on status of the unit,the unit will be stopped.If remote controller command is given,the mian unit will run under the command.



Manual switch

3.5 TIMER ON/OFF

3.5.1 TIMER ON

The system will continue to run if TIMER ON is set when the system is under ON status. If TIMER OFF is set when the system is under OFF status, the system will start to run under preset mode upon the time for auto start.

3.5 .2 TIMER OFF

If TIMER OFF is set when the system is under OFF status, the system will maintain its standby status upon the time for auto stop. If the TIMER OFF is set when the system is under ON status, the system will be stopped upon the tome for auto stop.

3.5.3 Set TIMER ON/OFF Simultaneously

If TIMER ON and TIMER OFF is set simultaneously when the system is under run status, the system will maintain its current operating status and be stopped upon the coming of preset time

If TIMER ON and TIMER OFF is set simultaneously when the system is under stop status, the system will maintain its stop status. It will be started until the time for auto start.

At the time for auto start every day, the system will run under preset mode.At the time for auto stop, the system will be stopped.

Noise silencing is provided under heating mode. If the unit is restarted in less than 3 minutes after it is stopped,3-minute lag protection is provided for the compressor.

3.5. 4 Change of Timer

When the system is under TIMER ON/OFF status, switch on or off the unit by pressing ON/OFF key by remote controller, Timer can be reset. The system will run under the last status setting.

3.6 Sleep Function

Setting SLEEP function under COOL or DEHUMIDIFY mode, the preset temperature will automatically rise by 1℃ after 1 hour and rise by another 1℃ after 2 hours. Preset temperature will rise by 2℃ in total within 2 hours. After that, the unit will run at this preset temperature , the indoor fan will run at preset speed.

Setting SLEEP function under HEAT mode, the preset temperature will automatically decrease by 1℃ after 1hour and decrease by another 1℃ after 2 hours. Preset temperature will decrease by 2 ℃ in total within 2 hours. After that, the unit will run at this preset temperature , the indoor fan will run at preset speed.

No sleep function under fan mode and auto mode.

3.7 Speed Control of Indoor Fan

The indoor fan will select fan speed(HIGH, MED or LOW) automatically according to the change of ambient temp.It can also be set by remote controller.

3.8 Buzzer

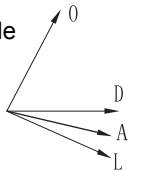
When the unitis energized, pressed, or receives a signal from remote controller, the buzzer will give out a beep.

3.9 Swing Control

After energized, guide louver will first anticlockwise turn to A position and then close the air outlet.

After the unit is turned on, guide louver will return standby to max. air outlet D2 for heating for cooling, guide louver will first turn to air outlet D1 and then return standby to L1. If the unit is in swing condition, the guide louver will swing between L1 and D1 for cooling and between L and D2 for heating.

After the unit is off, guide louver will anticlockwise turn to A position to close air outlet.



3.10 Memory Function

What can be memorized includes: mode, swing,preset temperature, preset fan speed.If the system is in timer and sleeping status,preset timer and sleeping can not be memorized and will be canceled after the power is off,which must be reset,

3.11 Indoor Indicators

In normal state,power supply/mode/fan speed/preset temp. indicator will display by current state.Every time of receiving command from remote controller,preset temp. will display blink for 10s.In other conditions,ambient temp. displays.

In normal state,power supply/mode/fan speed/preset temp. indicator will display by current state.Every time of receiving command from remote controller,preset temp. will display blink for 10s.In other conditions,ambient temp. displays.

Controller Function of Outdoor Unit

1 Temperature Parameters

- Outdoor exhaust temperature ($T_{exhaust}$)
- Outdoor ambient temperature ($T_{out\text{-}amb.}$)

2 Basic Functions

In each mode,once started,the compressor can not be stopped until it has been running for 6 min.(excluding malfunction protection and stopping the compressor for mode switching);once stopped,the compressor should be started in 3-min. delay (including mode switching,stopping the unit for temp. reached or by remote control);the compressor will start after 5S of the indoor fan.

2.1 Cooling Mode

2.1.1 Working Conditions and Process of Cooling

- If the compressor is in off status,and ($T_{in\text{-}amb.}$-T_{preset}) ≥ 0.5 ℃ , start the unit in cooling mode,in which case,outdoor fan and compressor start running,and microcomputer will auto adjust the frequency of compressor by cooling capacity requirements.
- In cooling running,if 0 ℃ ≤ (T_{preset}-$T_{in\text{-}amb.}$)≤ 2℃ ,the compressor will run at low frequency.
- In cooling running,if capacity requirements is 0(unit stop for cooling),and (T_{preset}-$T_{in\text{-}amb.}$) > 2℃,the compressor will stop, and outdoor fan will stop running in 60S.

➢ In this mode, switch valve is de-energized,and the temp. can be set in the range of 16-30℃.

2.1.2 Antifreeze Protection

In cooling or dehumidify mode,if it is detected that the system is under antifreeze protection, the compressor will stop or run with frequency decline ,and outdoor fan will bestopped in 60S. When antifreeze protection is releasedthe unit will resume its original operating status.

2.1.3 Control Logic of Outdoor Fan

If $T_{out\text{-}amb.}$ ≥ 26 ℃,outdoor fan will run at high speed.

If $T_{out\text{-}amb.}$ ≤ 24 ℃ ,outdoor fan will run at low speed.

In running,if 24 ℃ < $T_{out\text{-}amb.}$ < 26 ℃ ,the outdoor fan will remain original.

After turning on the unit ,the outdoor fan will be forced to run for 3 min, and then run at logical speed.

3.2.2 Dehumidifying Mode

- Working conditions and Process of dehumidifying:the same as that in cooling mode.
- State of 4-way valve: shut-off
- Temp. setting range:16-30 ℃ .
- Protection function: the same as that in cooling mode.

3.2.3 Fan Mode

- Compressor, outdoor fan and 4-way valve shut off.
- Temp. setting range:16-30 ℃.

3.2.4 Heating Mode

3.2.4.1 Working Conditions and Process of Heating

- If the compressor is in stopped state, （$T_{amb.}$ － 3 ） ℃≤ （T_{preset}－0．5 ） ℃ ,the unit will start heating,in which case, compressor, outdoor fan and 4-way valve will run and the microcomputer will adjust frequency of comprssor according to heating requirements.
- In heating process,if T_{preset}℃≤ （$T_{amb.}$ － 3 ） ℃≤ （T_{preset}+ 2 ） ℃ ,the compressor will run at low frequency.
- In heating process,if （$T_{amb.}$ － 3 ） ℃＞ （T_{preset}+ 2 ） ℃, the compressor will stop running and outdoor fan will stop running after 60-S delay.

Note:Stop the unit or switch into other mode in heating mode,the 4-way valve will de-energize after the compressor has stopped for 2 min.

➢ In this mode, the reversal valve is energized and temp.setting range is 16-30℃.

3.2.4.2 Logic Control of Outdoor Fan

If $T_{out\text{-}amb.}$≤ 19 ℃， the outdoor fan will run at high speed;

If $T_{out\text{-}amb.}$≥ 21 ℃， the outdoor fan will run at low speed;

In running process, if 19 ℃ < $T_{out\text{-}amb.}$< 21 ℃， the speed will remain original.

During running,the outdoor fan will be forced to run at high speed for 3min, and then turn to logical speed.

2.4.3 Defrosting Process

If it is detected the defoeting is required,and if the compressor running frequency is a little higher,the frequency will first reduced to some level and then the compressor and indoor fan stop,50s later,outdoor fan stops meanwhile,4-way valve stops after 45-second delay.The compressor will restart with 90Hz of running frequency in 55s to defrost.Upon defrsoting is completed,compressor running frequency will decrease to 60Hz, and 4-way valve and outdoor fan will start,10s later, compressor will run with increased frequency required by capacity.Indoor fan will run in 2 min at most.

If compressor is stopped for malfunction in heating mode,the indoor fan will run by blowing exhaust heat.

3 Current Protection Function in Cooling/Heating/Dehumidifying/Auto Mode

3.1 Overload pretection

When Ttube is detected too high, the compressor will run in limited or dropped frequency.When Ttube goes on rising over the stated value the compressor will stop.If Ttube resumes normal,so does the complete unit according to capacity requirements.

If 6 successive times ofoverload protection happens,the compressor won't resume running except pressing ON/OFFbutton.
In running process,if the comprssor has runfor 7 min,the times of overload protection will be cleared.

3.2 Delay pretection for compressor

Once be stopped, the compressor can not be restarted within 3mins.

3.3 Exhaust Temperature Pretection

If it is detected by the outdoor controller that the exhaust temperature is too high, the compressor will run in limited or dropped frequency.

If the exhaust temperature goes on rising over the stated value, the compressor will stop and it is detected that the exhaust temperature has resumed normal, the compressor will resume running according to capacity requirements.

If 6 successive times ofoverload protection happens,the compressor won't resume running except pressing ON/OFFbutton.
In running process,if the comprssor has runfor 7 min,the times of overload protection will be cleared.

3.4 Current Protection Function

1.Overload protection

If total current is detected over the stated value, the unit will be stopped as the indoor room temperature **meet the preset** value,after the compressor has stopped for 3 minutes, it will resume its original operating status automatically.

If 6 successive times ofoverload protection happens,the compressor won't resume running except pressing ON/OFFbutton.
In running process,if the comprssor has runfor 7 min,the times of overload protection will be cleared.

2.Current dropped frequency or limited frequency control:

The controller will drop the compressor frequency or prohibit the compressor frequency rising according to the change of total current.

3.5 Communication Malfunction

There is communication malfunction if it can not receiving correct signal for 3 minutes continuously, in which case, the outdoor unit will stop.

3.6 Module Protection

When module is in protection, the compressor will be stopped as the indoor room temperature meet the preset value, after the compressor has stopped for 3 minutes, it will resume its original operating status automatically.

If 6 successive times ofoverload protection happens,the compressor won't resume running except pressing ON/OFFbutton.
In running process,if the comprssor has runfor 7 min,the times of overload protection will be cleared.

3.7 Overheat Protection of Module

If it is detected the IPM temperature is too high, the compressor will run in limited or dropped frequency.If the IPM temperature goes on **rising over the stated value, the compressor will stop .When the IPM temperature resumes normal, and the compressor has stopped for 3 min., the complete unit will resume running.**

If 3 successive times of IPM protection in an hourhappens,the compressor won't resume running except pressing ON/OFFbutton.

3.8 OverloadProtection for compressor

If compressor oveload is detected,the indoor unit will stop as the indoor room temperature meet the preset value.If the compressor has stopped for 3 min. ,it should be reset to start.

3.9 9 PFC Protection

If start the unit in cooling,heating and dehumidifying mode,the compressor will operate in the frequency of 30Hz,and then PFC occurs after 30s.

At any time of stopping compressor,PFC will stop with the compressor at the same time.

Once PFC starts,protection signal will be detected soon.During PFC protection,PFC stops with the compressor at the same time.

PFC will resume operation automatically after 3min when malfunction happens to it.

6.3.3.10 Malfunction Detection of Temp. Sensor and IPM Overheat Detection Sensor

(1) In standby condition,malfunction of outdoor tube temp,ambient temp and IPM overheat detection sensor can not be detected.

(2)Malfunction of exhaust temp. sensor and IPM overheat detection sensor can be detected after the compressor starts and has run for 3 min.

(3) Within 10 min when the compressor starts or after defrosting ,heating and oil return are completed,malfunction of outdoor tube temp. sensor can not be detected.

(4) Malfunction of other outdoor temp. senors will be detected soon after the unit is started .The detection will last 30s.

(5) Once malfunction of IPM overheat detection sensor or other outdoor temp. sensors is detected,theunit will be stopped soon.

6.3.3.11 Outdoor Indicator Meaning(refer to Troubleshooting section)

D11	Definition	D12	Definition	D13	Definition
1blink	Compressor running	1blink	Stop for refrigerating overload	1blink	Quick refrigerating/heating
2 blinks	Stop for exhaust protection	2 blinks	Stop for heating overload	2 blinks	Defrosting
3 blinks	Stop for NEC drive module protection	3 blinks	Fault of communication with indoor unit	3 blinks	Oil return
4blinks	Stop for overcurrent protection	4blinks	Fault of communication with NCE module	4blinks	Nominal refrigerating/heating
5blinks	Stop for overload	5blinks	Fault of communication with computer	5blinks	Max. refrigerating/ heating
6blinks	Stop for refrigerating antifreeze	6blinks	Fault of outdoor ambient sensor	6blinks	Medium refrigerating/ heating
7blinks	Stop for sensor fault	7blinks	Fault of outdoor tube sensor	7blinks	Min.refrigerating/ heating
8blinks	Stop for communication fault (including indoor unit and NEC drive module)	8blinks	Fault of outdoor exhaust temperature sensor	8blinks	Stop
9blinks	Stop for compressor high voltage protection (Preserved)	9blinks	Communication malfunction sent from indoor unit	9blinks	Low pressure unrestorable
10blinks	Stop for compressor low voltage protection (Preserved)	10blinks	The parameters sent to NEC drive has some problem, unit stop		
11blinks	Cassette unit stop for water flow protection (Preserved)	11blinks	Fault of IPM temperature sensor		
12blinks	Stop for IPM overheat protection	12blinks			

D14	Definition	D15	Definition	D16	Definition
1blink	Air exhaust protection drop frequency	1blink	Air exhaust protection limit frequency	Bright	Receiving or sending computer data
2blinks	Overcurrent protection drop frequency	2blinks	Overcurrent protection limit frequency	Dark	Computer data received or sent
3blinks	Refrigerant overcurrent drop frequency	3blinks	Refrigerant overload limit frequency		
4blinks	Heating overcurrent drop frequency	4blinks	Heating overload limit frequency		
5blinks	Anti-freezing drop frequency	5blinks	Current 9.4A Frequency stays 2mins.		
6blinks	Stop for reduction of frequency to lowest	6blinks	Current 12A Frequency stays 2mins.		
7blinks	Stop for PFC protection	7blinks	limit frequency or drop frequency		
8blinks	Stop for compressor overload	8blinks	Compressor current limit frequency or drop frequncy		
		9blinks	IPM module overheat limit frequency or drop frequency		

D17	Definition (NEC drive information)	D18		Definition		
1blink	DC input voltage too low	When computer monitoring port is not short circuited	Bright	Reciving or sending indoor unit data		
2blinks	DC voltage too high			Dark Reciving or sending indoor unit data		
3blinks	AC current protection	When computer monitoring port is short circuited	Bright	Indoor unit data received or sent		
4blinks	IPM abnormal		Dark	Communication between mainboard and drive board is abnormal		
5blinks	In-built PFC protection					
6blinks	Startup failure					
7blinks	Phase failure or modulation failure					
8blinks	Firstly PFC protection, then module protection					

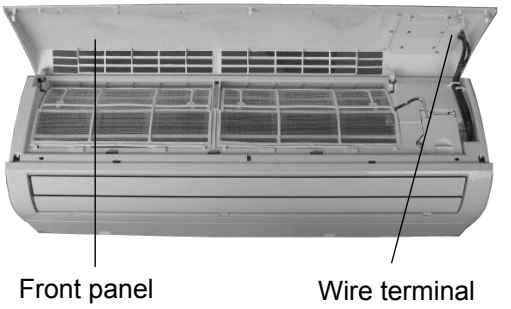
7 Disassembly and Assembly Procedures

7.1 Disassembly Process of Indoor Unit

Operating Procedures/Photos

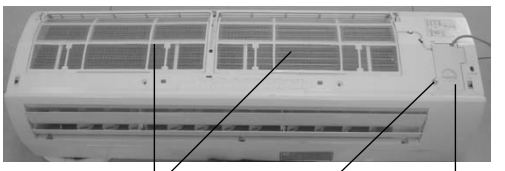
1. Disassemble the Front panel

Open the front panel. Firstly to screw off the screws that fixed at the guard plate on the receiving window both sides, disassemble the guard plate, then to remove the wiring terminal, then along the groove that fix the front panel to take out the front panel.



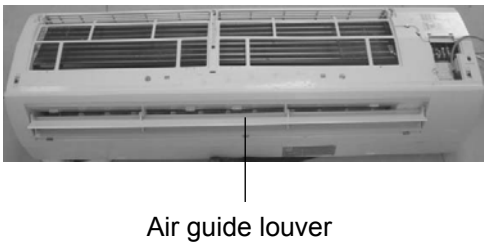
2. Disassembling the filter and wire-pressed clamp

Disassemble the filter, screw off the screw that fix the wire-pressed clamp can disassemble it.



3. Disassemble air guide louver

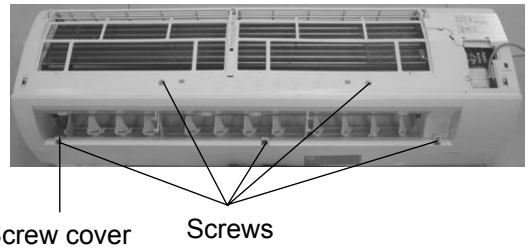
Bend the air guide louver by hands, and then loose the slipknot on the guide louver to disassemble the guide louver.



Operation procedures/pictures

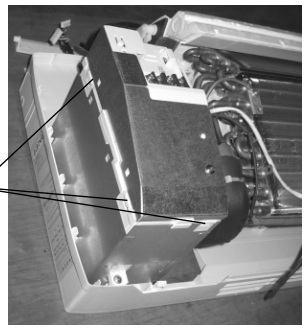
4. Disassemble Front Case

Open the three screw covers and unscrew five screws on front case. Pull open the clasp at the front and rear sides, can remove the front panel.



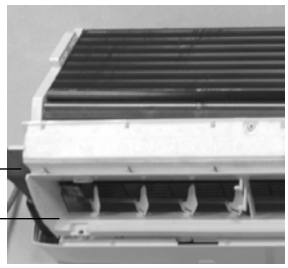
5. Disassemble the electric box cover

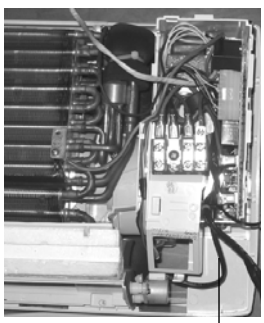
Loosen the 3 slipknots manually, and then pull upwards the electric box cover.



6. Dissasemble water tray sub-assy

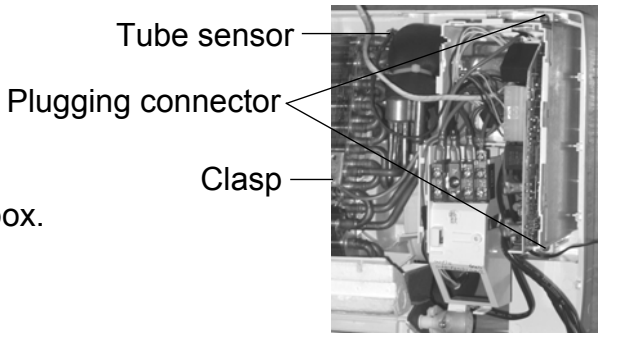
Unscrew the screws fixing the water tray and then loosen the slipknot in the other end. Pull out the terminal of stepping motor, and then pull upwards the water tray to take it out.





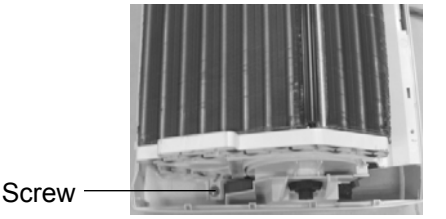
7. Disassemble Electric box

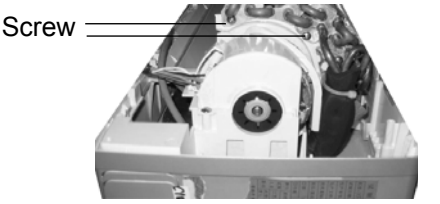
unplug the plugging connector of the indoor motor at the electric box, use screwdriver to unscrew the screw fixing the electric box and remove the electric box.



8. Disassemble Evaporator

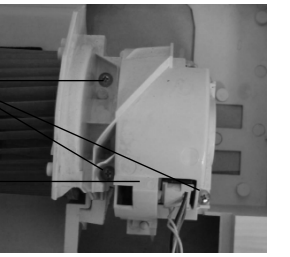
Use a screwdriver to loosen the screw (1pc) of left side, (2pcs) of right side. Take out the evaporator with your hands, so that the side plate clamp of evaporator falls out from the groove. Remove the evaporator with care. Take care to protect the connecting pipe.





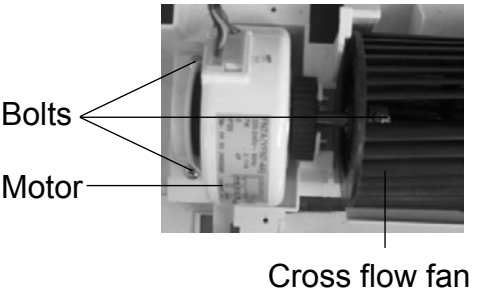
9. Disassemble Motor

Use a screwdriver to loosen the 3 screws fixing the motor clamp. Remove the motor clamp.
Unscrew the tighten nut which fix cross flow fan, then can take out the motor from the cross flow fan.



10. Disassemble cross flow fan

Take out motor, then remove the cross flow fan from the left bearing holder. Refer to Fig.7-27

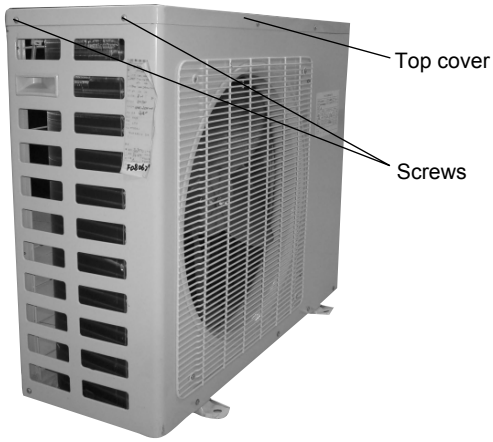


7. 2 Disassembly Procedures for Outdoor Unit

Operating Procedures / Photos of outdoor unit

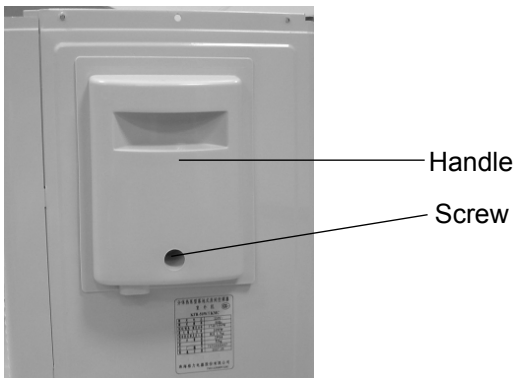
1. Disassemble Top Cover

Screw off the screws which fix the top cover, then lift it up, can take off the top cover.



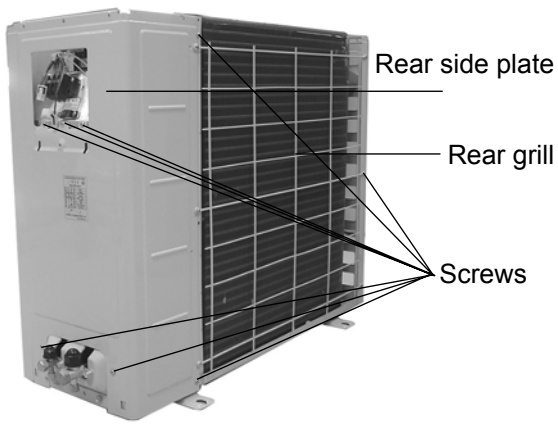
2. Disassemble the handle

Screw off one screw which fix the handle, then adown to push the handle, then can take off the handle.



3. Disassemble the rear side plate sub-assy

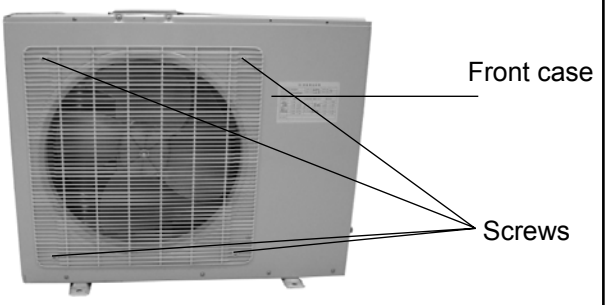
Screw off the screws which fixed the rear grill and rear side plate, disassemble the rear grill, then can take off the rear side plate sub-assy.



Operating Procedures / Photos of outdoor unit

4. Disassemble the front case

Screw off the screw which fix the front case, then pull it upwards, can take off the front case.

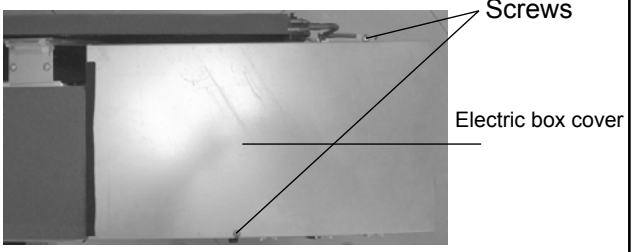


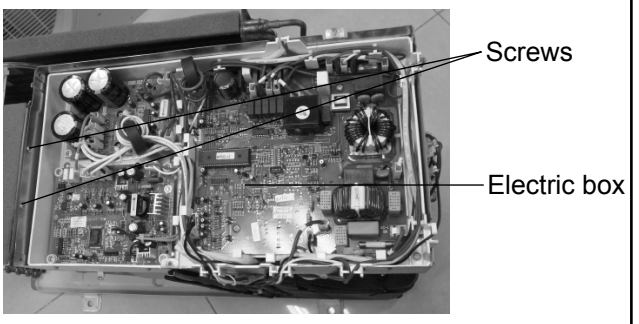
5. Disassemble cabinet

Screw off the screws which fix the cabinet, then can take off the cabinet.

6. Disassemble the electric box sub-assy

Screw off 2pcs screw which fix the electric box cover, then can take off the electric box cover. Use the screw driver to screw off 2pcs on the electric box, pull out the wire terminal of the electric box, then lift it up can take off the electric box.

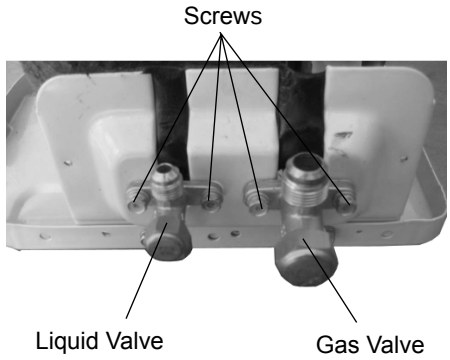




Operating Procedures / Photos

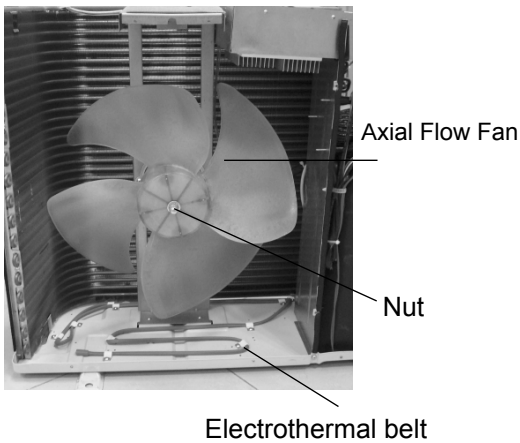
7. Disassemble Valves

Unscrew the two screws fixing the gas valve, unsolder the soldering point between the gas valve and the return-air duct and remove the gas valve (note: when unsoldering the soldering point, use wet cloth to completely wrap the gas valve to prevent valve body from being harmed by high temperature).
Unscrew the two screws fixing the liquid valve, unsolder the soldering point connecting the liquid valve and the fork type pipe, and remove the liquid valve.



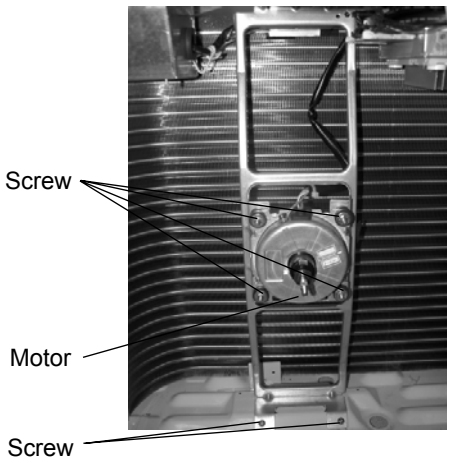
8. Disassemble Axial Flow Fan

Use a spanner to loosen the holding nut to remove the nut, spring washer and flat washer and thenremove the axial flow fan with force.



9. Disassemble Outdoor Motor

Screw off the four tapping screws fixing the motor, pull out the motor lead-out cable plug and remove the motor. Screw off the two tapping screws fixing the motor support, and pull the motor support upwards to remove it.



Operating Procedures / Photos

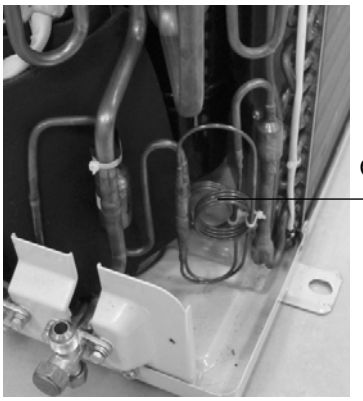
10. Disassemble 4-Way Valve

(Only for cooling and heating unit)

Screw off the holding nut of the 4-way valve coil and remove the coil. Use wet cotton cloth to wrap the 4-way valve, unsold the four soldering points connecting the 4-way valve, and remove the 4-way valve. Be quick during the unsoldering process, pay attention to keep the wrapping cloth wet and do not allow the soldering flame to burn the compressor lead-out cable. (caution: only after discharging all freon).

11. Disassemble Capillary Sub-assembly

Unsolder the soldering points connecting the capillary sub-assy and the other pipelines, and remove the capillary sub-assy.



12.Disassemble Compressor

Firstly unsolder the pipes connecting the compressor, and then unscrew the three foot nuts at the compressor to remove the compressor.

7.4 Disassembly Procedure of Outdoor Unit

Operating Procedures / Photos

7.2.1 Disassemble Front Side Plate

Unscrew the screws fixing the front side plate to remove it. As show in Fig.7-13:

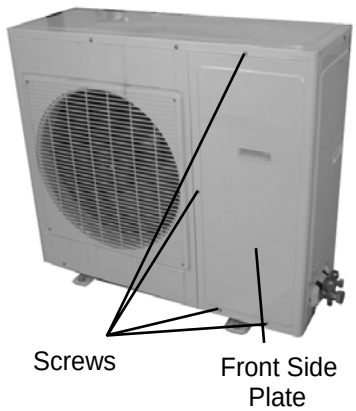


Fig. 7 — 13

7.2.2 Disassemble Top Cover

Unscrew the screws fixing the top cover, and then lift the top cover to remove it. As show in Fig.7-14.

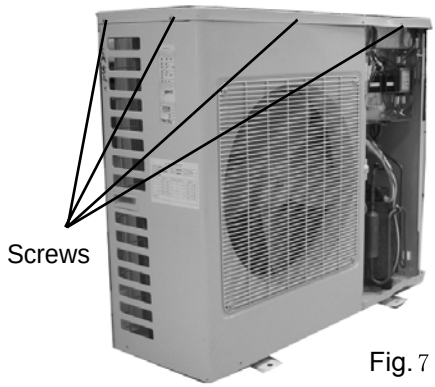


Fig. 7 — 14

7.2.3 Disassemble Rear Grill

Unscrew the screws fixing rear grill and rear side plate.After removing rear grill, disassemble rear side panel sub-assy. As show in Fig.7-15

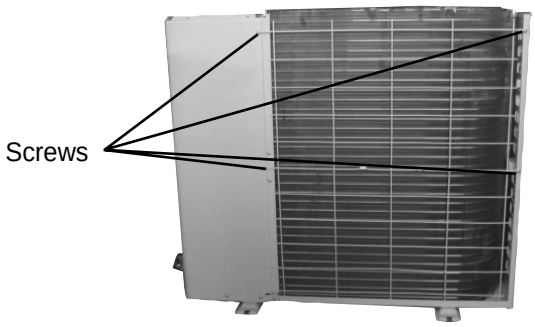


Fig. 7-15

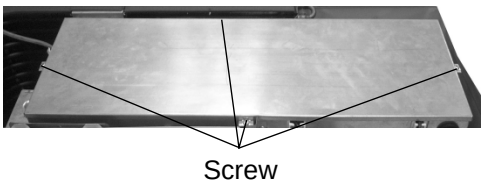
Operating Procedures / Photos

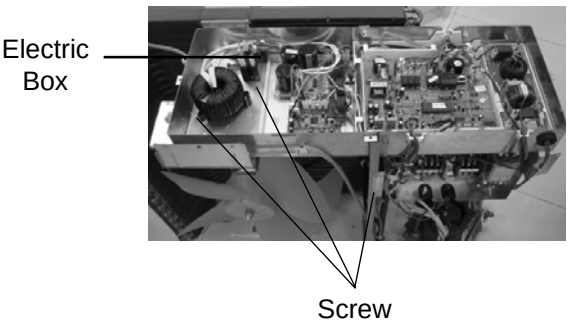
7.2.4 Disassemble Cabinet

Unscrew the screws fixing the cabinet to remove it.

7.2.5 Disassemble the electric box

Screw off 4pcs screw which fix the electric box, then can take off the electric box cover.
Screw off 5pcs screw from electric box, pull out the wire terminal of electric box, then lift it up can take off it.





7.2.6 Disassemble the rear side plate

screw off 8pcs screw which fixed the rear side plate, then can disassemble the rear side plate.

Operating Procedures / Photos

7.2.7 Disassemble Axial Flow Fan

Unscrew the nut fixing the fan with a spanner to take out the fan .

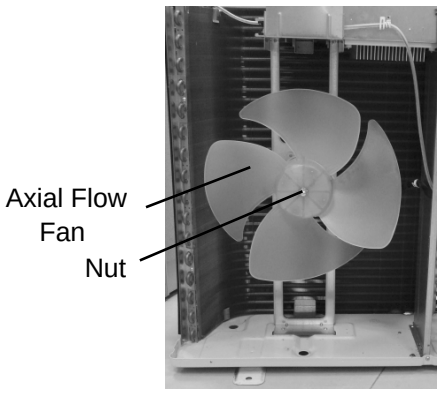


Fig.7－19

7.2.8 Disassemble Outdoor Motor

Unscrew the screws fixing the motor support ,and then lift it upwards to remove it. Unscrew the screws fixing the motor and pull out the connection line between it and electric box to remove it.

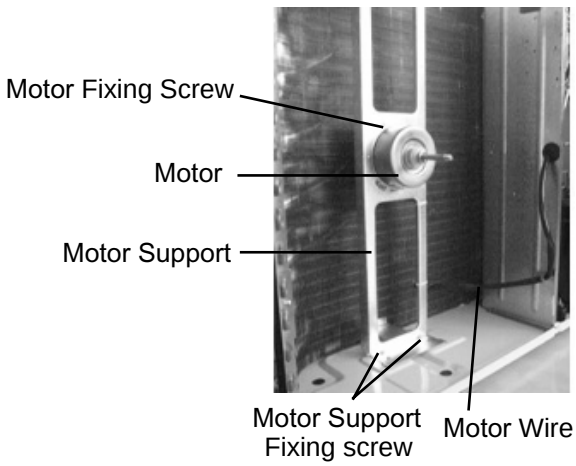


Fig.7－20

7.2.9 Disassemble Four-way Valve

Only for cooling and heating unit
Unscrew the fastening nut of the four-way valve coil and remove the coil. Wrap the four-way valve with wet cotton and unsolder the 4 weld spots connecting the four-way valve to take it out. Welding process should be as quick as possible and keep wrapping cotton wet all the time. Be sure not to burn out the lead-out wire of compressor.

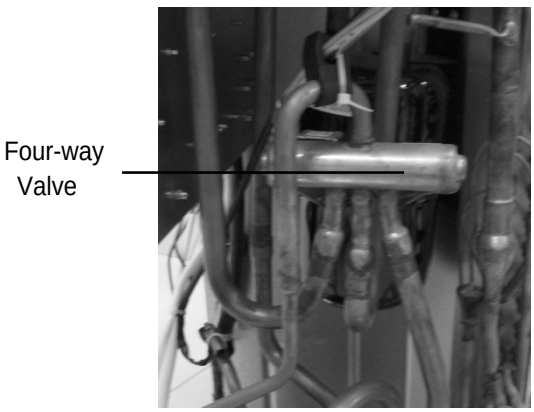


Fig.7－21

7. 2. 10 Disassemble Capillary

Unsolder the four welding points connecting the two capillary sub-asslies with the liquid valve and the condenser, and remove the capillary sub-assy.
As show in Fig.7-22)

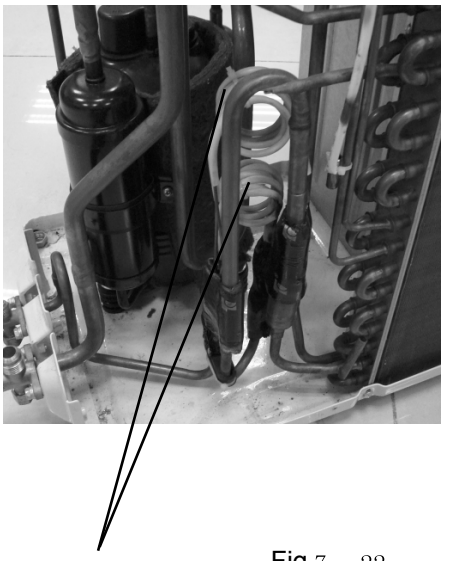


Fig.7 — 22

7. 2. 11 Disassemble Gas Valve and Liquid Valve

Unscrew the four bolts fixing the two valves, unsolder the welding point connecting the gas valve with the return-air pipe, and remove the gas valve (caution: when unsoldering the soldering point, wrap the gas valve completely with wet cloth, so as to prevent the valve body from harmed by high temperature). Unscrew the four bolts fixging the liquid valve, and remove the liquid valve.
(refer to Figure 7-23)

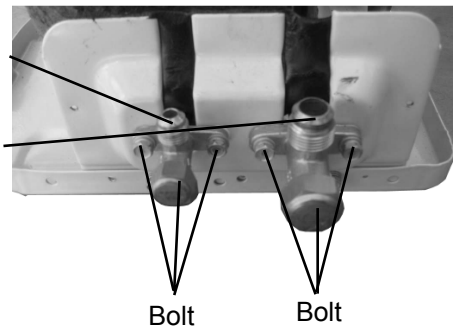


Fig. 7 — 23

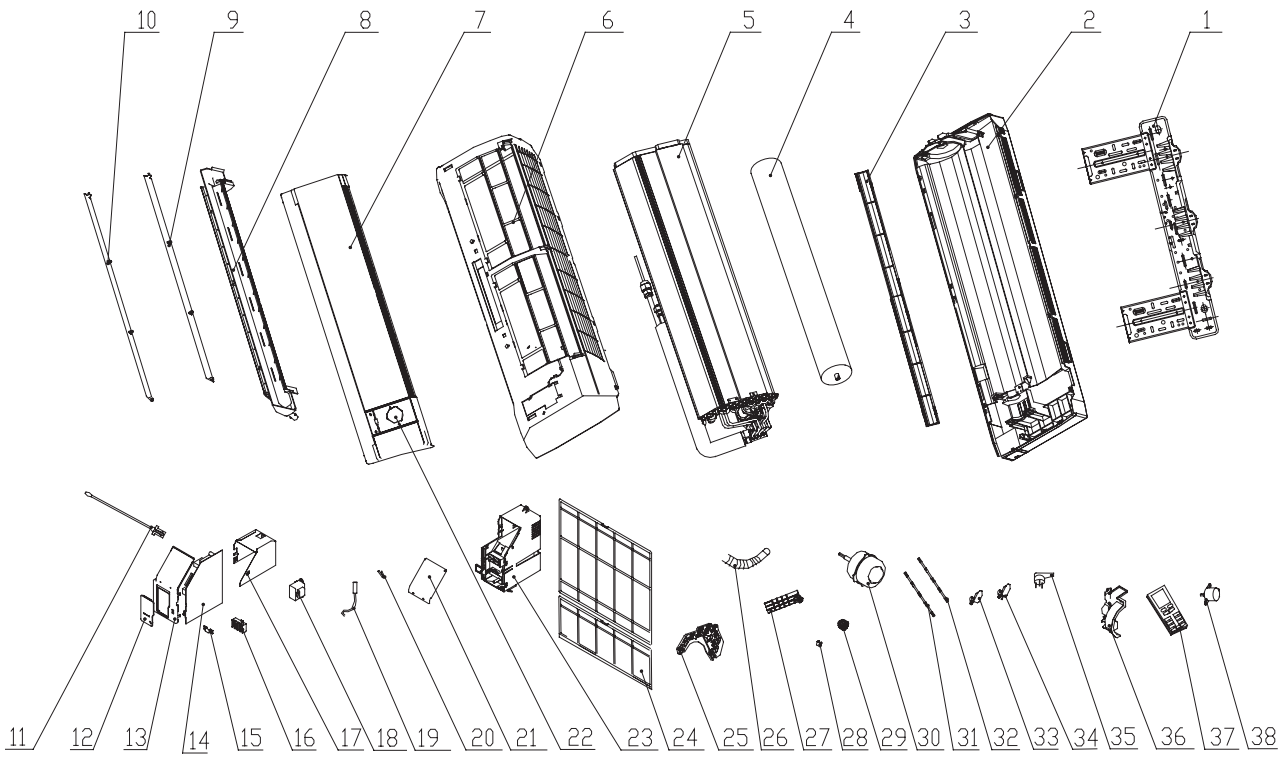
7. 2. 12 Disassemble Compressor

Unscrew the six nuts with washers at the feet of the two compressors (caution: only after discharging all freon). Unsolder the suction and the discharge pipes of the compressor, carefully remove the pipes and take out the compressor.
(refer to Figure 7-24)

Fig. 7 — 24

8 Exploded View and Components and Parts List

8.1 Exploded View of Indoor Unit

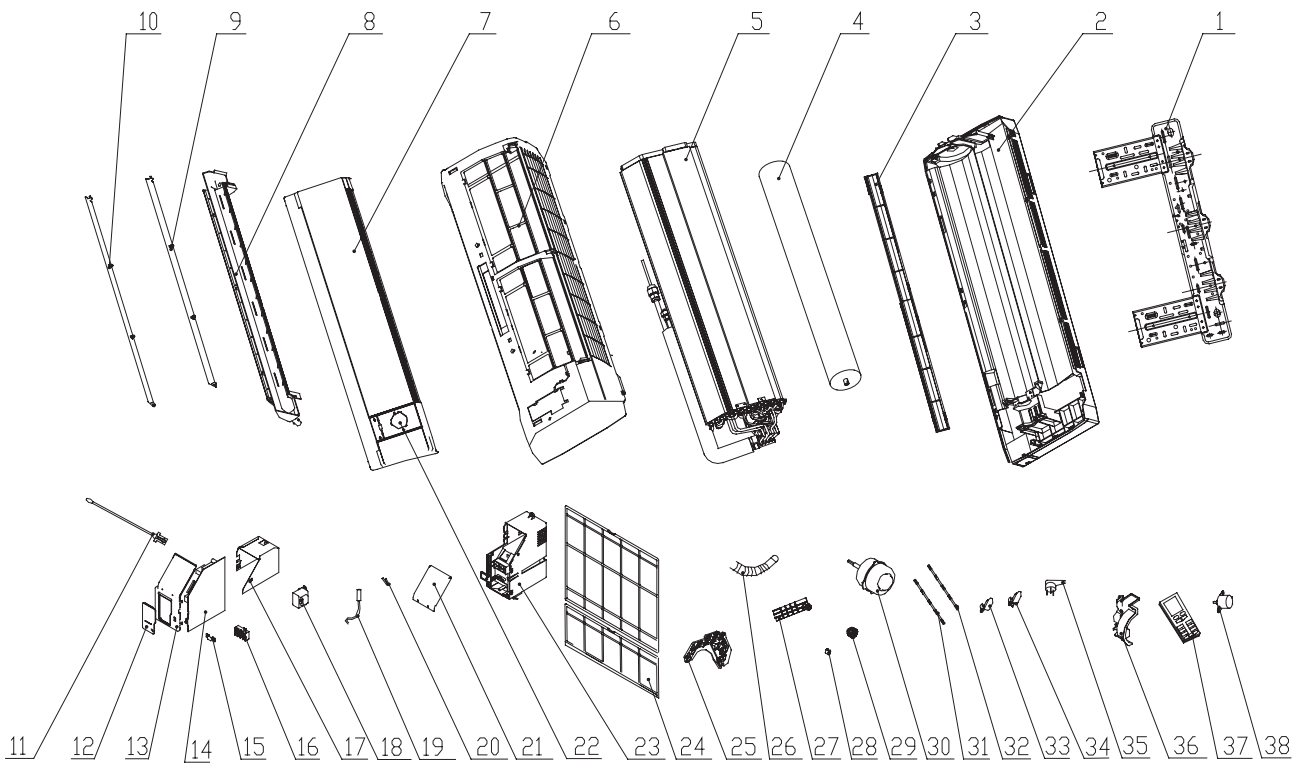


8.2 Components and Parts List of Indoor Unit

No	Description	Part Code	Qty
		ASH-18AIN (PT)	
1	Wall-Mounting Frame	01252004	1
2	Rear Case	22202329	1
3	Helicoid tongue	26252009	1
4	Cross Flow Fan	10352022	1
5	Evaporator Assy	010022283	1
6	Front Case	200026529	1
7	Front Panel	20002844	1
8	Water Tray	20182057	1
9	Guide Louver（up）	10512085	1
10	Guide Louver（down）	10512086	1
11	Room Sensor 15k	390000451	1
12	Electric Box Cover 1	20112019	1
13	Electric Box Cover	201120201	1
14	Main PCB	30032050	1
15	Wire Clamp	71010103	1
16	Terminal Board T4B3A	42011233	1
17	Lower Shield of Electric Box	01592037	1
18	Transformer 57X25C	43110237	1
19	Tube Sensor 20k	390000595	1
20	Sensor Insert	42020063	1
21	Upper Shield of Electric Box	01592038	1
22	Receiver Board 5H53EA	30545552	1
23	Electric Box	20112018	1
24	Filter Assy	11122048	2
25	Evaporator Support	24212067	1
26	Drainage Pipe	05230014	1
27	Pipe Clamp	24242001	1
28	Screw Cover	24252015	3
29	Fan Bearing	76512210	1
30	Motor FN20X	150120671	1
31	Swing Link 1	10582057	1
32	Swing Link 2	10582058	1
33	Swing Louver	10512429	11
34	Swing Louver	10512430	1
35	Power Cord	none	0
36	Motor Clamp	26112095	1
37	Remote Controller YB1B4	30511005	1
38	Stepping Motor MP28AA	15212001	1

The above data is subject to change without prior notice.

8. 3 Exploded View of Indoor Unit

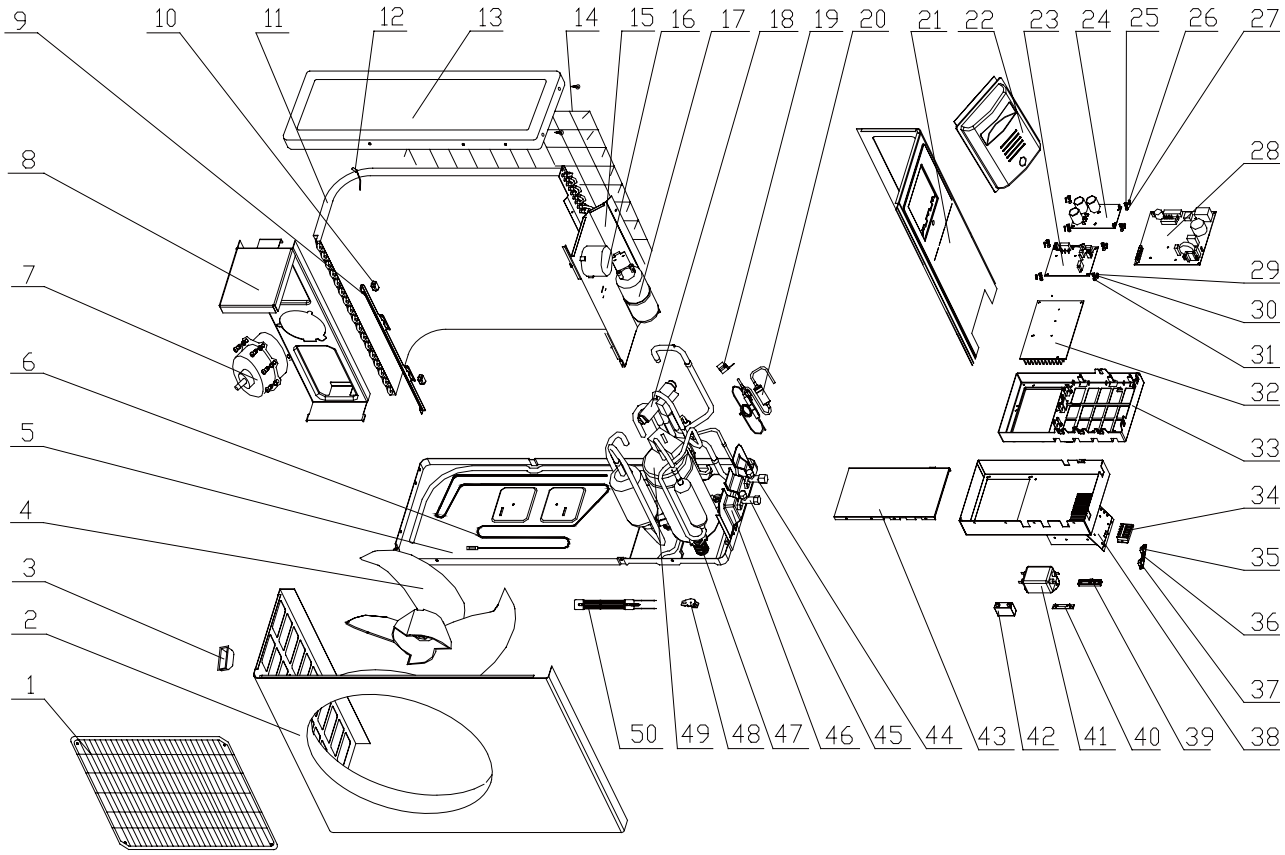


8.4 Components and Parts List of Indoor Unit

No	Description	Part Code	Qty
		ASH-24AIN (PT)	
1	Wall-Mounting Frame	01252004	1
2	Rear Case	22202329	1
3	Helicoid tongue	26252009	1
4	Cross Flow Fan	10352022	1
5	Evaporator Assy	010022362	1
6	Front Case	200026529	1
7	Front Panel	20002844	1
8	Water Tray	20182057	1
9	Guide Louver（up）	10512085	1
10	Guide Louver（down）	10512086	1
11	Room Sensor 15k	390000451	1
12	Electric Box Cover 1	20112019	1
13	Electric Box Cover	201120201	1
14	Main PCB	30032050	1
15	Wire Clamp	71010103	1
16	Terminal Board T4B3A	42011233	1
17	Lower Shield of Electric Box	01592037	1
18	Transformer 57X25C	43110237	1
19	Tube Sensor 20k	390000595	1
20	Sensor Insert	42020063	1
21	Upper Shield of Electric Box	01592038	1
22	Receiver Board 5H53EA	30545552	1
23	Electric Box	20112018	1
24	Filter Assy	11122048	2
25	Evaporator Support	24212067	1
26	Drainage Pipe	5230014	1
27	Pipe Clamp	24242001	1
28	Screw Cover	24252015	3
29	Fan Bearing	76512210	1
30	Motor FN20X	150120671	1
31	Swing Link 1	10582057	1
32	Swing Link 2	10582058	1
33	Swing Louver	10512429	11
34	Swing Louver	10512430	1
35	Power Cord	none	0
36	Motor Clamp	26112095	1
37	Remote Controller YB1B4	30511005	1
38	Stepping Motor MP28AA	15212001	1

The above data is subject to change without prior notice.

8. 5 Exploded View of Outdoor Unit

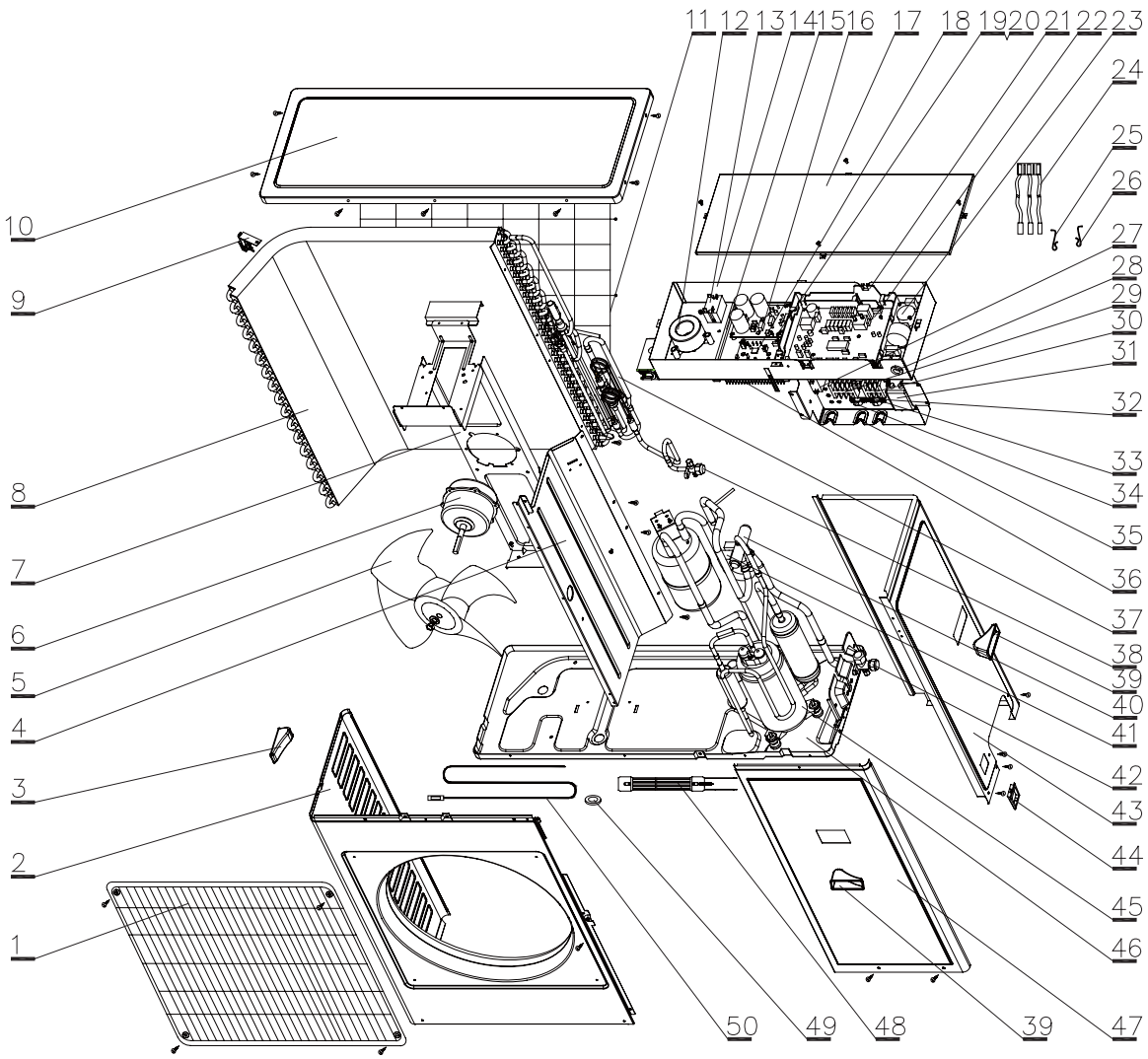


8.6 Components and Parts List of Outdoor Unit

No	Description	Part Code	Qty
		ASH-18AIN (PT)	
1	Front Grill	01473008	1
2	Front Plate	01303162P	1
3	Left Handle	26235401	1
4	Axial Flow Fan	10335253	1
5	Metal Base	01203633P	1
6	Electric Heater Band	765100041	1
7	Motor FW60T	15013703	1
8	Motor Support	01705003	1
9	Condenser Support	01793004	1
10	Pipe Protection Devices	76512406	2
11	Condenser Assy	01133461	1
12	Sensor	3900028001	1
13	Top Cover	01255001	1
14	Rear Grill	01473006	1
15	Isolation Sheet	01233054	1
16	Reactor(PFC)	43120011	1
17	Liquid-gas Separator	07225001	1
18	4 – Way Valve	430004032	1
19	4 – Way Valve Coil	430004002	1
20	Capillary Sub-Assy	03103547	1
21	Rear Side Plate	01305013	1
22	Handle Assy	26235255	1
23	Power Module	32210055	1
24	PFC Module	30111018	1
25	Module Support Base	24213029	4
26	ScrewM4X20	70110274	4
27	Module Support Cap	24213010	4
28	Main PCB WB8235E	30038216	1
29	ScrewM4X20	70110274	4
30	Module Support Base	24213029	4
31	Module Support Cap	24213030	4
32	Radiator	49013008	1
33	Electric Box 4	20112036	1
34	Wiring Terminal	42010255	1
35	Wire Clamp	71010102	1
36	Isolation Washer	70410523	1
37	Wire Clamp	71010003	1
38	Electric Box Assy	01403532	1
39	Fuse Support	24213032	1
40	Fuse Assy	46010056	1
41	Filter 30SS4-1BC2-R-Q	43130012	1
42	Capacitor CBB61 3uF/450V	33010027	1
43	Electric Box Cover	01413102	1
44	Valve 1/2"	071302392	1
45	Valve 1/4"	07130239	1
46	Valve Support	01715006	1
47	Rubber foot of compressor	NONE	3
48	OH Thermistor	NONE	1
49	Compressor C-6RVN93HOV	00103041	1
50	Electric Heater Band(Compressor)	7651300401	1

The above data is subject to change without prior notice.

8. 7 Exploded View of Outdoor Unit



8.8 Components and Parts List of Outdoor Unit

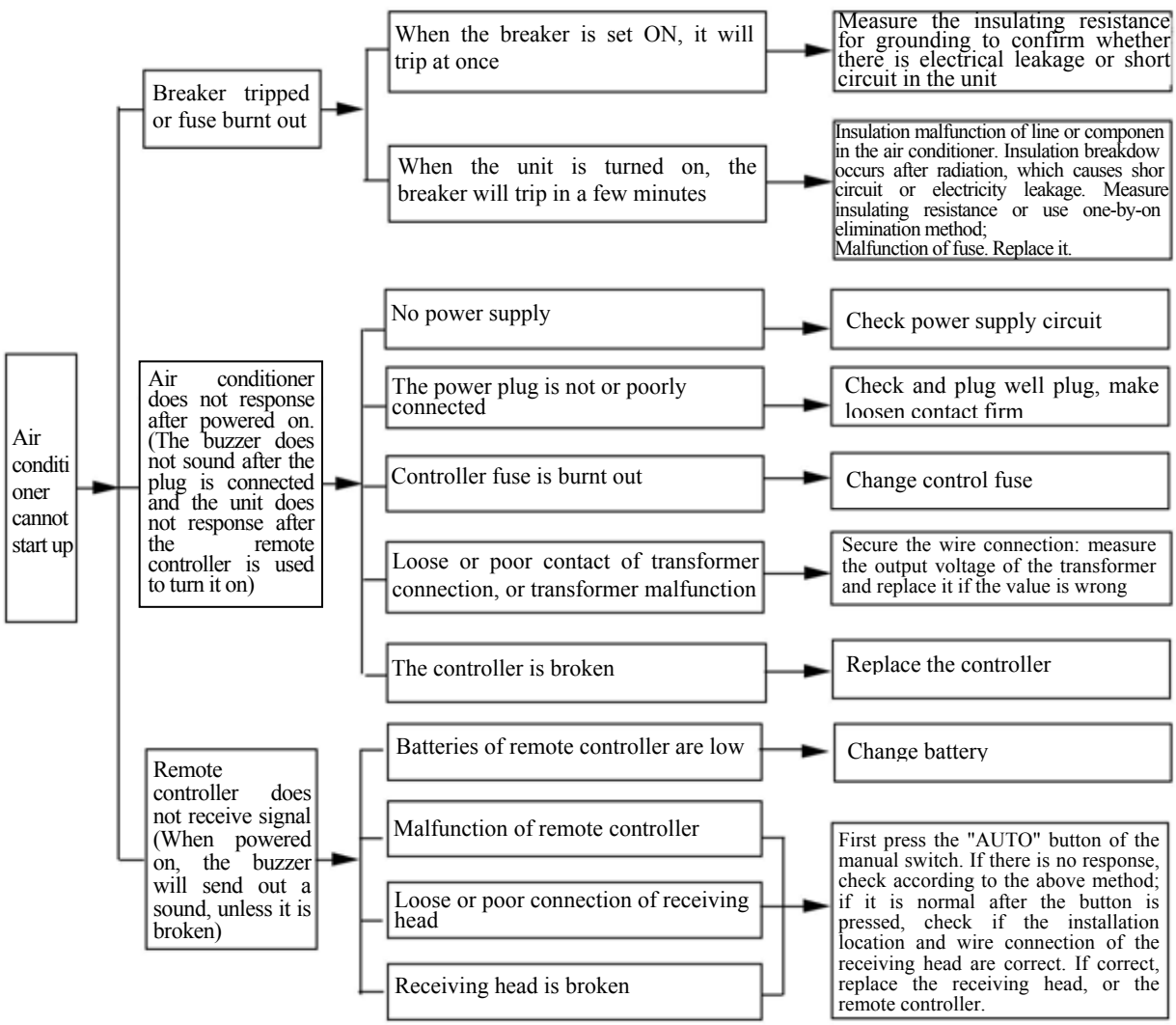
No	Description	Part Code	Qty
		ASH-24AIN (PT)	
1	Front Grill	01473001	1
2	Housing	01433011	1
3	Small Handle	26235401	1
4	Clapboard Assy	01233039	1
5	Axial Flow Fan	10335253	1
6	Fan Motor FW60T	15013703	1
7	Motor Support Sub-Assy	01703087	1
8	Condenser Assy	01103910	1
9	Temp Sensor Support	24213005	1
10	Top Cover	01255262	1
11	Rear Grill	01475252	1
12	Reactor	43120011	1
13	Relay VC15-3A1B	44020334	1
14	Electric Box Assy	01403592	1
15	Module Support	24213008	1
16	PCB JGP011	30111018	1
17	Electric Box Cover Sub-Assy	01403629	1
18	Main PCB 2 W9W2	30039165	1
19	PCB Support（up）	24213029	8
20	PCB Support（down）	24213010	8
21	PCB Support	24213009	1
22	Main PCB 1 W9W2C	30039198	1
23	Filtering Board W9W2	30039163	1
24	Temperature Sensor	3900028001	1
25	Sensor Insert	42020063	1
26	Sensor Insert	42020066	1
27	Capacitor	33010027	1
28	Cable-Cross Loop	76510021	1
29	Terminal Board	42011043	1
30	Terminal Board	42011242	1
31	Filter	43130008	1
32	Wire Clamp	71010102	1
33	Isolation Washer	70410523	1
34	Wire Clamp	71010003	1
35	Cable-Cross Loop	76514004	5
36	Radiator	49013011	1
37	Capillary Sub-Assy	03103397	1
38	Cut-off Valve	07130209	1
39	Handle	26235253	2
40	4-way Valve	43000411	1
41	4-way Valve Fittings	4300040022	1
42	Gas Valve Sub-Assy	07103030	1
43	Rear Side Plate	01305260	1
44	Cable-Cross Loop	76515203	1
45	Compressor	00103051	1
46	Underpan Assy	01203560	1
47	Front Side Plate	01305247	1
48	Electric Heater Band(Compressor)	32003001	1
49	Choke Plug	06813401	1
50	Electric Heater Band (Metal Base)	765100041	1

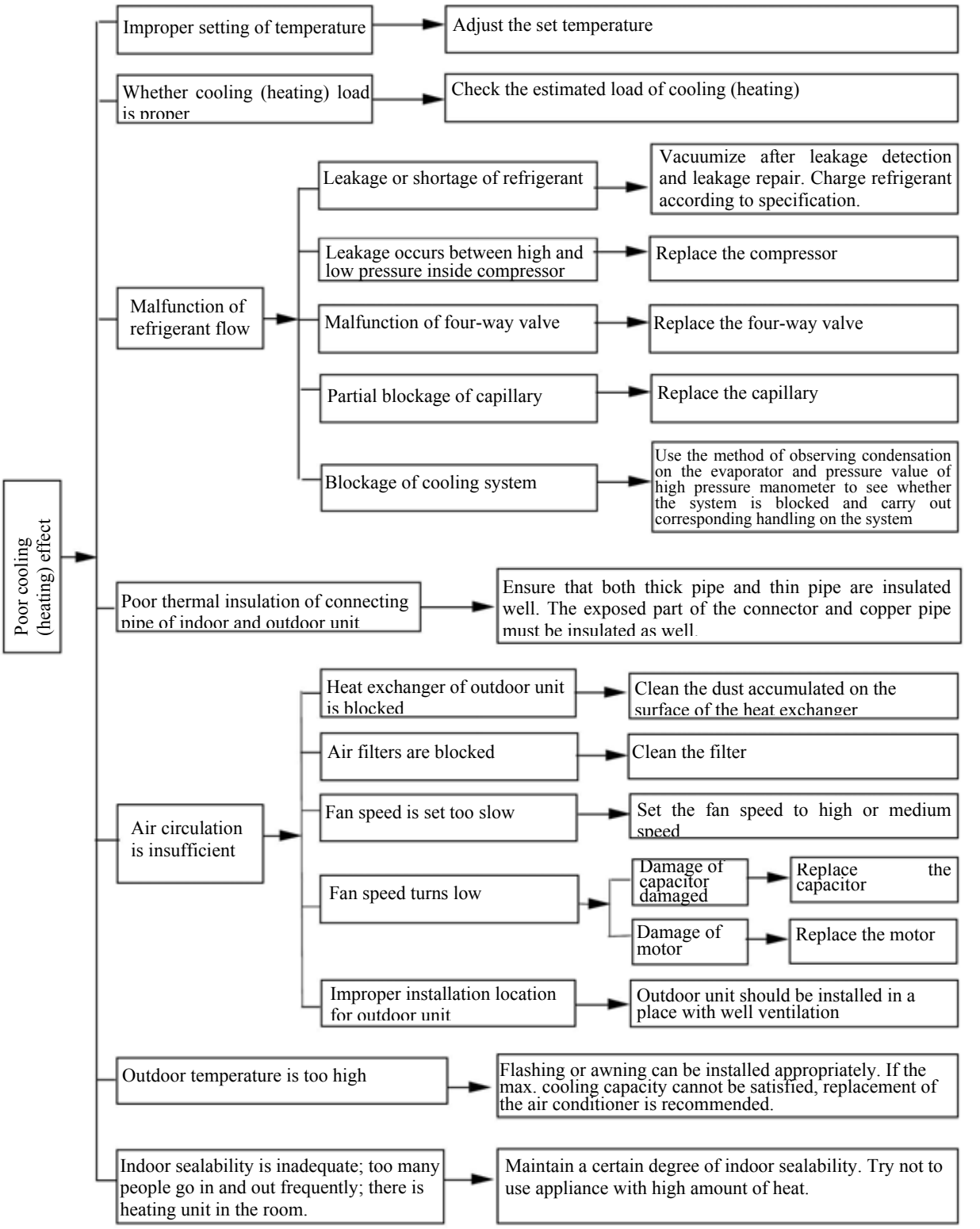
The above data is subject to change without prior notice.

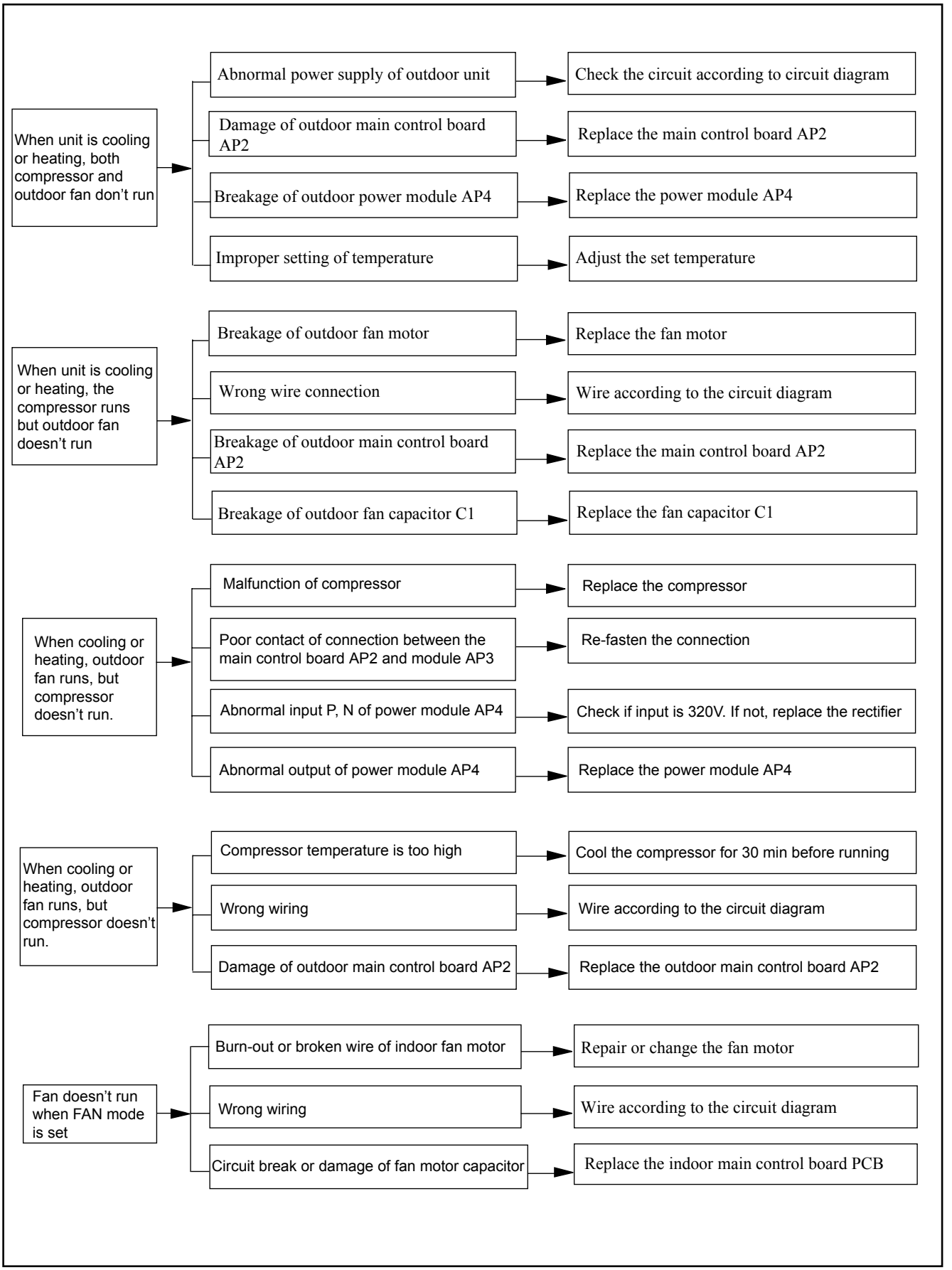
9 Troubleshooting

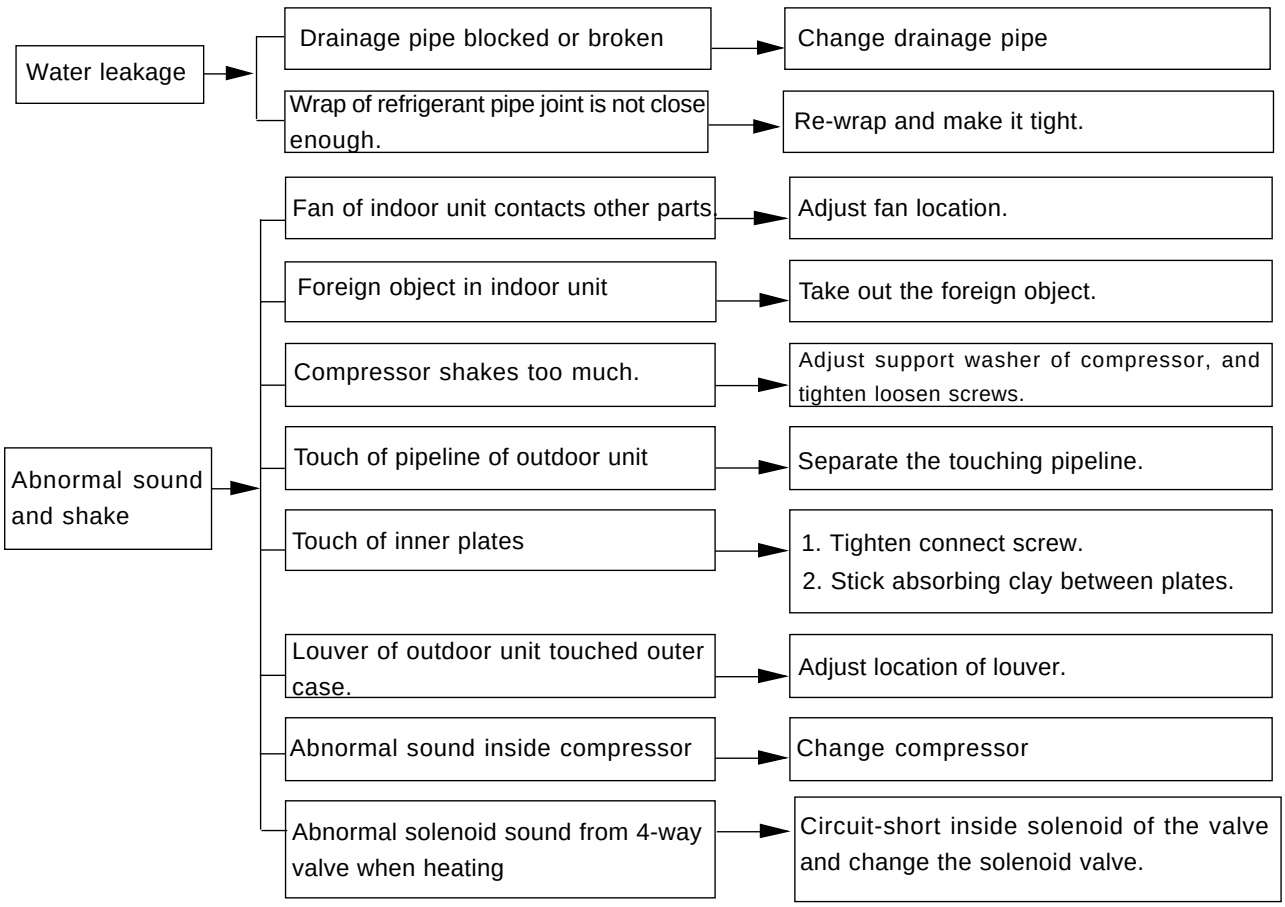
9.1 Common section

Analysis in this section is used for Linge Wind D.C. Inverter Series. Before analysis, you can diagnose according to the indicator display on outdoor unit.


Air conditioner cannot start up
Breaker tripped or fuse burnt out
When the breaker is set ON, it will trip at once
Measure the insulating resistance for grounding to confirm whether there is electrical leakage or short circuit in the unit
When the unit is turned on, the breaker will trip in a few minutes
Insulation malfunction of line or componen in the air conditioner. Insulation breakdow occurs after radiation, which causes shor circuit or electricity leakage. Measure insulating resistance or use one-by-on elimination method;
Malfunction of fuse. Replace it.
Air conditioner does not response after powered on. (The buzzer does not sound after the plug is connected and the unit does not response after the remote controller is used to turn it on)
No power supply
Check power supply circuit
The power plug is not or poorly connected
Check and plug well plug, make loosen contact firm
Controller fuse is burnt out
Change control fuse
Loose or poor contact of transformer connection, or transformer malfunction
Secure the wire connection: measure the output voltage of the transformer and replace it if the value is wrong
The controller is broken
Replace the controller
Remote controller does not receive signal (When powered on, the buzzer will send out a sound, unless it is broken)
Batteries of remote controller are low
Change battery
Malfunction of remote controller
Loose or poor connection of receiving head
Receiving head is broken
First press the "AUTO" button of the manual switch. If there is no response, check according to the above method; if it is normal after the button is pressed, check if the installation location and wire connection of the receiving head are correct. If correct, replace the receiving head, or the remote controller.


Poor cooling (heating) effect
Improper setting of temperature
Adjust the set temperature
Whether cooling (heating) load is proper
Check the estimated load of cooling (heating)
Malfunction of refrigerant flow
Leakage or shortage of refrigerant
Vacuumize after leakage detection and leakage repair. Charge refrigerant according to specification.
Leakage occurs between high and low pressure inside compressor
Replace the compressor
Malfunction of four-way valve
Replace the four-way valve
Partial blockage of capillary
Replace the capillary
Blockage of cooling system
Use the method of observing condensation on the evaporator and pressure value of high pressure manometer to see whether the system is blocked and carry out corresponding handling on the system
Poor thermal insulation of connecting pipe of indoor and outdoor unit
Ensure that both thick pipe and thin pipe are insulated well. The exposed part of the connector and copper pipe must be insulated as well.
Air circulation is insufficient
Heat exchanger of outdoor unit is blocked
Clean the dust accumulated on the surface of the heat exchanger
Air filters are blocked
Clean the filter
Fan speed is set too slow
Set the fan speed to high or medium speed
Fan speed turns low
Damage of capacitor damaged
Replace the capacitor
Damage of motor
Replace the motor
Improper installation location for outdoor unit
Outdoor unit should be installed in a place with well ventilation
Outdoor temperature is too high
Flashing or awning can be installed appropriately. If the max. cooling capacity cannot be satisfied, replacement of the air conditioner is recommended.
Indoor sealability is inadequate; too many people go in and out frequently; there is heating unit in the room.
Maintain a certain degree of indoor sealability. Try not to use appliance with high amount of heat.


When unit is cooling or heating, both compressor and outdoor fan don't run
Abnormal power supply of outdoor unit
Check the circuit according to circuit diagram
Damage of outdoor main control board AP2
Replace the main control board AP2
Breakage of outdoor power module AP4
Replace the power module AP4
Improper setting of temperature
Adjust the set temperature
When unit is cooling or heating, the compressor runs but outdoor fan doesn't run
Breakage of outdoor fan motor
Replace the fan motor
Wrong wire connection
Wire according to the circuit diagram
Breakage of outdoor main control board AP2
Replace the main control board AP2
Breakage of outdoor fan capacitor C1
Replace the fan capacitor C1
When cooling or heating, outdoor fan runs, but compressor doesn't run.
Malfunction of compressor
Replace the compressor
Poor contact of connection between the main control board AP2 and module AP3
Re-fasten the connection
Abnormal input P, N of power module AP4
Check if input is 320V. If not, replace the rectifier
Abnormal output of power module AP4
Replace the power module AP4
When cooling or heating, outdoor fan runs, but compressor doesn't run.
Compressor temperature is too high
Cool the compressor for 30 min before running
Wrong wiring
Wire according to the circuit diagram
Damage of outdoor main control board AP2
Replace the outdoor main control board AP2
Fan doesn't run when FAN mode is set
Burn-out or broken wire of indoor fan motor
Repair or change the fan motor
Wrong wiring
Wire according to the circuit diagram
Circuit break or damage of fan motor capacitor
Replace the indoor main control board PCB


Water leakage
Drainage pipe blocked or broken
Change drainage pipe
Wrap of refrigerant pipe joint is not close enough.
Re-wrap and make it tight.
Abnormal sound and shake
Fan of indoor unit contacts other parts
Adjust fan location.
Foreign object in indoor unit
Take out the foreign object.
Compressor shakes too much.
Adjust support washer of compressor, and tighten loosen screws.
Touch of pipeline of outdoor unit
Separate the touching pipeline.
Touch of inner plates
1. Tighten connect screw.
2. Stick absorbing clay between plates.
Louver of outdoor unit touched outer case.
Adjust location of louver.
Abnormal sound inside compressor
Change compressor
Abnormal solenoid sound from 4-way valve when heating
Circuit-short inside solenoid of the valve and change the solenoid valve.

Note:

1. When maintaining, before detecting the voltage between the modular PN is less than 50V, please never touch any of the terminals, in order to avoid electric shock.
2. When replacing the batteries, commutating bridge, both of them should be coated with the coolant.

Analysis or processing of some of the malfunction display:

1. Compressor discharge protection

Possible reasons: shortage of refrigerant; blockage of air filter; poor ventilation or air flow short pass for condenser; the system has noncondensing gas (such as air, water etc.); blockage of capillary assy (including filter); leakage inside four-way valve causes incorrect operation; malfunction of compressor; malfunction of protection relay; malfunction of discharge sensor; outdoor temperature too high.
Processing method: refer to the malfunction analysis in the above section.

2. Low voltage overcurrent protection

Possible reason: Sudden drop of supply voltage.

3. Communication malfunction

Processing method: Check if communication signal cable is connected reliably

4 Sensor open or short circuit

Processing method: Check whether sensor is normal, connected with the corresponding position on the controller and if damage of lead wire is found.

5. Compressor overload protection

Possible reasons: insufficient or too much refrigerant; blockage of capillary and increase of suction temp.; improper running of compressor, burning in or stuck of bearing, damage of discharge valve; malfunction of protector.

Processing method: adjust refrigerant amount; replace the capillary; replace the compressor; use universal meter to check if the contactor of compressor is fine when it is not overheated, if not replace the protector.

6. System malfunction

i.e. overload protection. When tube temperature (Check the temperature of outdoor heat exchanger when cooling and check the temperature of indoor heat exchanger when heating) is too high, protection will be activated.

Possible reasons: Outdoor temperature is too high when cooling; insufficient outdoor air circulation; refrigerant flow malfunction.
please refer to the malfunction analysis in the previous section for handling method .

7. IPM module protection

Processing method:Once the module malfunction happens,if it persists for a long time and can not be self- canceled, cut off the power and turn off the unit,and then re-energize the unit again after about 10 min.After repeating the procedure for sever times, if the malfunction still exists,replace the module.(refer to the next page)

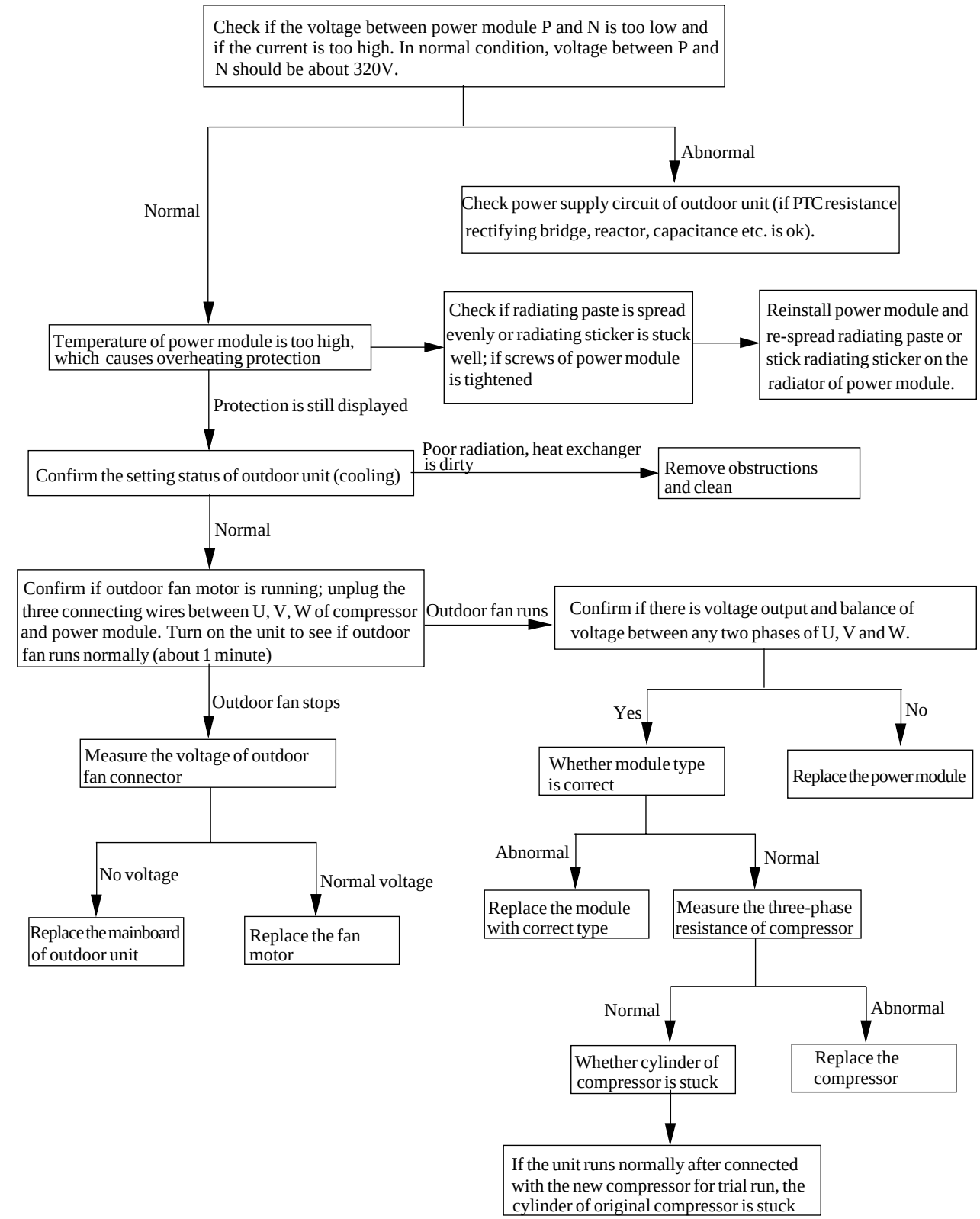
8. PTC protection

Possible reasons:ambient temp. is too high. or PFC module is too heat;the power orcurrent of complete unit is too high, or PFC voltage is too low;connecting wire of PFC control plate is in poor contact.

Processing method:Once protection happens,first check connecting wire of PFC control plate ,and if the unit is still abnormal with continuous protection,replace PFC controller.

Module protection

Handling method:


Check if the voltage between power module P and N is too low and if the current is too high. In normal condition, voltage between P and N should be about 320V.
Abnormal
Normal
Check power supply circuit of outdoor unit (if PTC resistance rectifying bridge, reactor, capacitance etc. is ok).
Temperature of power module is too high, which causes overheating protection
Check if radiating paste is spread evenly or radiating sticker is stuck well; if screws of power module is tightened
Reinstall power module and re-spread radiating paste or stick radiating sticker on the radiator of power module.
Protection is still displayed
Confirm the setting status of outdoor unit (cooling)
Poor radiation, heat exchanger is dirty
Remove obstructions and clean
Normal
Confirm if outdoor fan motor is running; unplug the three connecting wires between U, V, W of compressor and power module. Turn on the unit to see if outdoor fan runs normally (about 1 minute)
Outdoor fan runs
Confirm if there is voltage output and balance of voltage between any two phases of U, V and W.
Outdoor fan stops
Yes
No
Measure the voltage of outdoor fan connector
Whether module type is correct
Replace the power module
No voltage
Normal voltage
Abnormal
Normal
Replace the mainboard of outdoor unit
Replace the fan motor
Replace the module with correct type
Measure the three-phase resistance of compressor
Normal
Abnormal
Whether cylinder of compressor is stuck
Replace the compressor
If the unit runs normally after connected with the new compressor for trial run, the cylinder of original compressor is stuck